OCTOBER 6, 1938 FIRST AERO WEEKLY IN THE WORLD REGD. AT THE G.P.O. AS A NEWSPAPER

FLIGHT

5 1938

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

The Sigh of Relief

IN Britain, at any rate, there is no militaristic spirit, and, though there may be some who question whether France and ourselves ought not, for the sake of principle, to have chosen the rougher road, there is nobody who does not rejoice that we have been spared a world war. Not so many years ago international discussions such as took place last week would, almost certainly, have ended in the arbitrament of the sword. Now, the hatred of war is so intense that the unprecedented efforts of the Prime Minister have succeeded in preserving peace in our time. The gratitude felt for Mr. Chamberlain is universal, and is not confined to this country or even to Europe. The Empire and the United States are equally full of admiration for his persistence. The people of Germany, we are convinced, are in no less degree grateful for Mr. Chamberlain's efforts. In this feeling of thankfulness it is only just to include M. Daladier and the people of our good friend, France.

Influence of the Air

TO no small extent the intensity of this devotion to peace is due to the existence of the air arm. Although air attacks on civil populations are undoubtedly futile as a means of winning a war, the chance still remains that a ruthless enemy might employ them. The possibility was recognised by the extraordinary A.R.P. energies which we all saw last week. It may therefore be claimed and conceded that the sheer horror of aerial bombardment has become an influence for peace in the world. By this we do not mean to admit that fear forced, or could have forced, Britain and France to submit to threats. The people of London were gloriously calm in their readiness to face whatever the Government should call upon them to endure. A world war, even without the added abomination of air bombardment of cities, would be such a calamity to civilisation as to justify any efforts for peace which did not, in the words of the leader of His Majesty's Opposition, sacrifice principle. But the prospects of air bombing certainly sharpened the desire for peace, and so we may admit that in a negative sense the aeroplane has proved itself a deterrent from universal war. It played a more actively peaceful part in making possible the conferences of the leaders which resulted in an agreement.

A.R.P.

DURING the last eventful week everybody was agreeably surprised by the smooth working of the A.R.P. organisation in London. Everything was not perfect, but it was a surprise to find how good the organisation was. Nearly everybody in London was measured for a respirator, and very many actually received one. The queues which lined up at the various distribution centres were orderly, and the work was got through with no upset to the daily life and business of the metropolis. The speed with which trenches were dug in the parks and open spaces was also a surprise.

The authorities believe that in the event of war gas would be less of a danger to a great city than high-explosive bombs would be, and H.E. bombs might be aimed at quite legitimate targets of military importance. Neither the one form of bombing nor the other would bring victory to an enemy, and the most that attacks on civilians could hope to achieve would be panic. The smooth work of the A.R.P. department was the best safeguard against panic, and, indeed, there was no sign at all of panic among the citizens of the London boroughs. They, and all the other people of the country, well deserved the thanks and congratulations of His Majesty the King for the calm way in which they faced whatever might happen. The fact that the A.R.P. authorities were awake and alive in taking precautions did an im-

The King's Message to the Nation.

Sunday, October 2, 1938.

THE time of anxiety is past, and we have been able to-day to offer our thanks to the Almighty for His mercy in sparing us the horrors of war.

I would like now to thank the men and women of this country for their calm resolve during these critical days, and for the readiness with which they responded to the different calls made upon them.

After the magnificent efforts of the Prime Minister in the cause of peace, it is my fervent hope that a new era of friendship and prosperity may be dawning among the peoples of the world.

mense amount to stimulate the courage of the population.

Most remarkable of all was the revelation of the plans for evacuating from London all those sections of the population who were not obliged to stay to do some necessary work. Many individuals and families left London on their own initiative. Their action was prudent, for if war had broken out the fewer left in London the better it would have been for all. But everyone who had work to do prepared to carry on with the same resolution as was shown in the four tragic years of the last war.

The Lesson

THE crisis has certainly done us all good. It has woken us up to realities and shaken some of us out of our devotion to unpractical nonsense. Not for some space will the voice of the pacifist be heard in the land, telling us that the way to peace is to disarm and never to mention war or weapons. Peace-lovers we have proved ourselves to be, proved it to the hilt (and there are mutterings in the world suggesting that we love peace over-much); but pacifists we must never become if we value all that is worthy in life. With difficulty we can refrain from cursing those Ministries of recent years which let our armaments sink below the safety level. Again we have come to recognise the truth of the old Roman maxim, *Si vis pacem, para bellum*: "If you want peace, be ready for war."

The crisis has stimulated the recruiting for all three Services, and that is very much to the good. Everybody wants to know that our A.A. guns can shoot straight at raiding bombers, that our searchlight crews are well drilled and can pick up the enemy without the waste of precious seconds, and that nothing is wanting which can bring our fighters to grips with the foe. We know now that A.R.P. is not a mere fad of the Government, but a real necessity which must be sedulously developed until every post is filled and the whole machine is well oiled. Labour disputes in aircraft factories must be settled justly without stoppages of work, and a new spirit will certainly be found in that sphere. Quarrels among ourselves which seemed so very important a few weeks ago now seem very trivial when the lives of thousands may depend on getting on with the job.

Consolidation

THAT the signing of the declaration by the Fuehrer and Prime Minister will and can mean immediate disarmament few would believe. Ultimately a reduction of armaments to an agreed level may become possible, but for the moment we must accept Mr. Chamberlain's dictum that we cannot relax our rearmament efforts, nor indulge in unilateral disarmament.

There are, however, certain directions in which a halt could be called at once without serious consequences. For instance, the large new factories which had been planned, but work upon the building of which has scarcely been begun, might well come under reconsideration.

The existing shadow factories, which originally came into being in an endeavour to create a stand-by in case of emergency, are proving their value. When developed to the full they will fulfil that purpose admirably, but it seems scarcely necessary to increase their number.

By rationalising our production of aircraft and engines it should now also become possible to spare British military and civil aircraft for the Empire overseas, and to avoid the need for purchases of aircraft abroad.

Our awakening to the importance of commercial aviation coincided with our realisation of the need for expanding the Royal Air Force, and although much has been achieved, there is still a great amount of work to be done in developing commercial aviation to its full extent.

There are many problems waiting to be solved. There is the question of high-altitude flying with passengers in pressure cabins; there is the problem of long-range transoceanic air routes; there is the very large machine of the future and a host of other subjects which are in need of investigation. It would be well if we could make sure that, should another national emergency arise, our Prime Minister would not have to travel in a foreign aeroplane because our firms have been too busy building military types.

Some Gaps

NOW that the crisis is over we may reflect on some of our shortcomings. There is no desire to flog a willing horse, and everybody knows that the Air Ministry and the War Office are and have been only too anxious to hurry on the supply of new equipment for the air defence forces. That anxiety started very nearly too late. We know, for everyone knows, that only a month ago, when the Air Minister visited Kidbrooke, the ten squadrons of the Balloon Barrage Group had not all got their forty-five balloons apiece; and 450 balloons is still short of the 600 which Air Commodore Hearson once mentioned as a desirable number for the defence of London. The Air Ministry has reduced the minimum age for enlisting in these squadrons from 38 to 25, which shows that things are stirring in the right direction.

During the last air exercises it was rather disturbing to note that only the East Coast was at all thickly studded with searchlights, for it might be presumed that when air exercises are held on a large scale the opportunity to practise would be given to every searchlight group. For the defence of the country by night the lights are at least as important as the A.A. guns, for the beams make possible the interceptions by the fighters, and we are always told that the fighters are the main striking force of the defence.

During the anxious days it was discouraging to drive past a fighter aerodrome and see Gauntlets standing on the tarmac. Soon, we hope, there will be nothing less formidable than Gladiators, and those very good biplanes may still play a useful part in our defence in the now happily unlikely event of any threatened attack.

DIARY OF FORTHCOMING EVENTS—Page 303.

A Definite Policy Wanted

IT should now be possible, also, to get down to a rational policy in air armament. Under the panic expansion it is to be feared that the Air Ministry has merited the old phrase applied to the Irish Party in the House of Commons: "It does not know what it wants and it won't be happy till it gets it."

Too often has a specification been issued and firms built machines to it, only to be told, by the time the machine is finished, that the specification was not a very useful one, and that it is not being proceeded with. Or a firm has come to the end of a contract, probably a very large contract, and has asked the Air Ministry for further orders for the same machine. The reply has been that the machine is obsolescent, and that no further orders will be placed. The work of dismantling the jigs has begun when suddenly the firm has been told to stay its hand as a further large order is being placed.

That sort of thing may have been unavoidable under panic conditions, although it is a little difficult to see why. With breathing space for proper production planning it should not occur.

High-speed Helicopters

SO accustomed has one become to thinking of the helicopter merely as a type of aircraft which will hover that one is apt to overlook the possibility that it might also be capable of high maximum speed. So far helicopter protagonists have been mainly preoccupied with problems of controllability, and certainly the solution of these was necessary before it was profitable to bother about "performance." The Focke-Wulf F.W.61 has amply demonstrated that controllability can now be provided, both in forward flight and when hovering. With that fact proved, the next step is to turn the helicopter into a practical aircraft.

Recent investigations, theoretical as well as experimental, seem to indicate that the helicopter should be capable not only of hovering flight but, what is rather more surprising, of horizontal speed at least equivalent to that of the "comparable" aeroplane. By comparable is meant, of course, an orthodox fixed-wing aeroplane carrying approximately the same load for a given horse-power.

An American investigator, Mr. Montgomery Knight, of the Georgia School of Technology, has examined the subject theoretically, and at the sixth annual meeting of the American Institute of the Aeronautical Sciences he presented a paper on his conclusions. From that paper, printed in the September issue of the *Journal of the Aeronautical Sciences*, it emerges, with theoretical proof provided, that a fixed wing of given span and an aspect ratio of 6 requires slightly greater horse-power at high speeds than does a rotor of the same span. That statement should be qualified by adding that the rotor must be of rather low "solidity," a term which means that the area of the rotor blades must be small in comparison with the swept area of the rotor disc.

But (there is always a but) the price paid for the greater efficiency at high speed is a lower efficiency when climbing. The author of the paper assumes that the drag of the rest of the two types can be made the same, in which case the complete helicopter should also be capable of greater speed than the complete aeroplane. That assumption may be challenged. At least the twin-rotor helicopter would be difficult to clean up to this extent. But Mr. Hafner thinks the single rotor can be made to do all that is necessary, so why worry?

THE HARBINGER: A fine study of the British Airways Lockheed 14 in which the Prime Minister made his second historic flight to Germany. A description of the special equipment of this new fleet appears in the following pages.

BRITISH AIRWAYS'

Modifications for European and West African Services

SOME little time ago, in *Flight* of August 18, a few general and descriptive impressions were given of the first Lockheed Fourteen to be put into service in Europe—actually by K.L.M. on their North Sea run. In that article it was explained that British Airways' Fourteens, which were at that time still to be delivered, would differ quite materially in operational detail from the standard version.

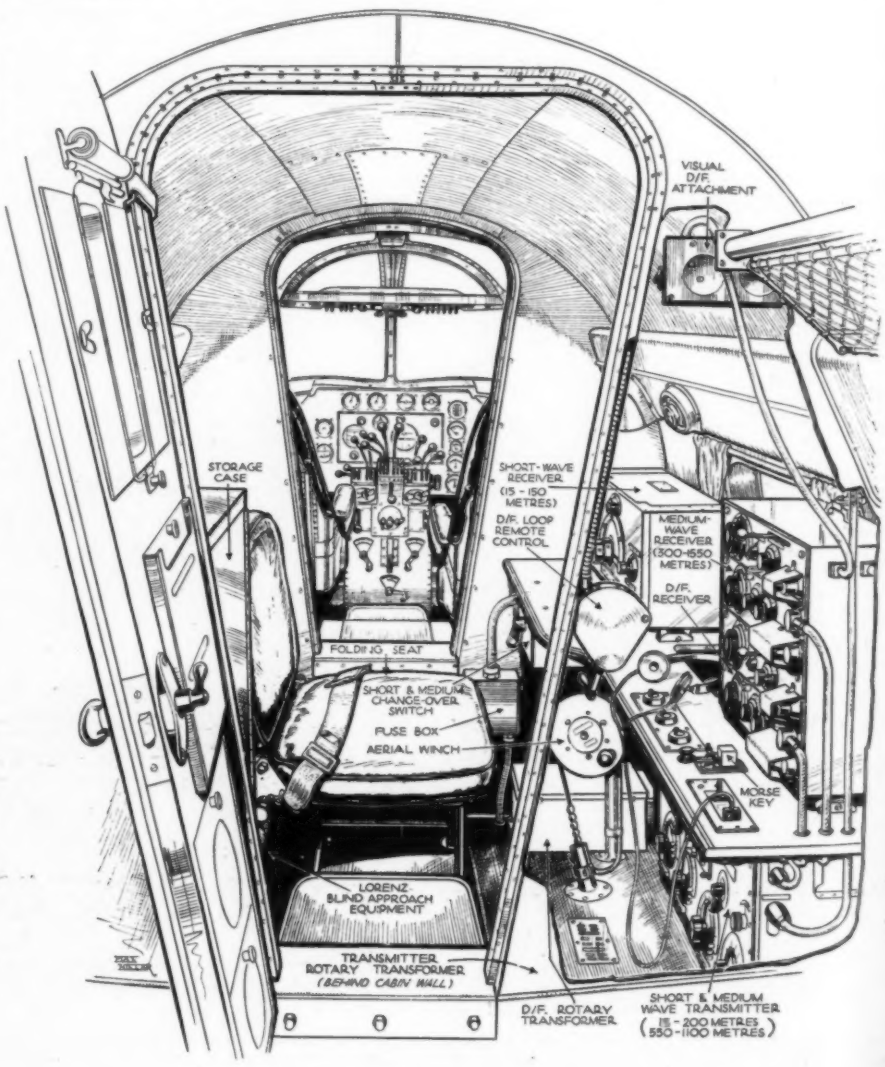
These differences were not only necessary to incorporate equipment which would make the type suitable for long-distance work on the West African service (which will shortly be experimentally operated by British Airways as a preliminary to the South American extension), but also to bring the general layout into line with that generally considered suitable for European operations.

First and foremost, these Fourteens are designed with a special compartment for the radio operator and his equipment, which is entirely cut off from that used by the passengers. Additionally, the control cabin has been modified to take a transparent roof. In the standard Fourteen this roof is opaque and, particularly since the windscreen is not too deep, the pilots find that the range of useful vision is seriously reduced during turns.

Certain special items of minor equipment are also fitted to these Fourteens, but in a general way the bulk of the equipment is standard and has already been described. The primary feature of this standard equipment is that of thorough duplication, whether direct or indirect. It should be almost impossible for the pilot to find himself without any one of the essential instruments or controls since, even when any particular item is not actually duplicated the equipment is so arranged that other instruments or controls can be made to do similar work.

Apart from the Lorenz blind approach receiving equipment, which has been installed by Standard Telephones, British Airways' Fourteens carry Marconi short- and medium-wave transmitters and receivers operating on wavebands of 15 to 200 m. and 550 to 1,100 m. The two transmitters are actually combined, while the medium-wave equipment incorporates a D/F receiver with remote control for the loop. This loop is of the small diameter type, enclosed within a streamlined shell mounted above the fuselage. The rotation of the loop is, of course, done by the operator, but, when necessary, the receiver signals can be switched over to a visual indicator arranged on the dashboard.

All the radio equipment, except that self-contained section which is devoted to ultra short-wave reception, is, including the aerial winch, mounted on the starboard

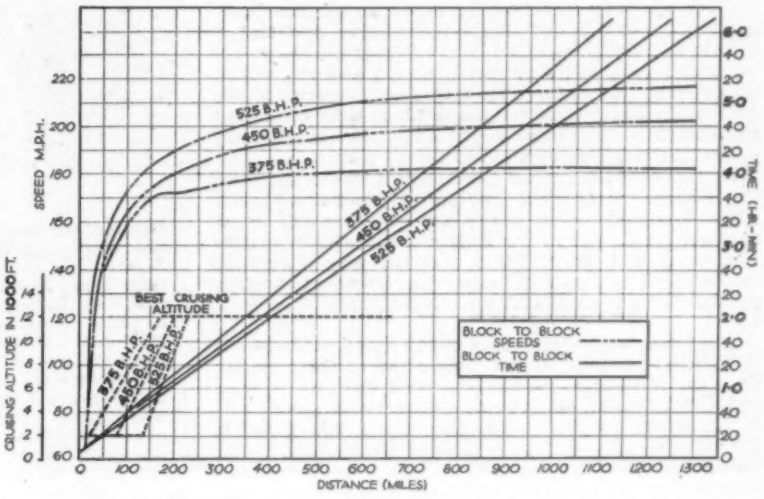


The "works" in one of British Airways new Lockheed Fourteens. It will be seen that the standard lay-out has been modified to incorporate a special compartment for the radio operator, and in this sketch the bulkhead dividing this compartment from that used by the passengers is cut away on the right to show the position of the different features of the extensive radio equipment. . . This includes not only a blind approach receiver and medium-wave sets, but also short-wave equipment, since the Fourteens will eventually be used for long-distance work on the West African service.

S' OCKHEED FOURTEENS

: Sc tails of the Radio Equipment : Remarkable Long-range Performance

Some idea of the methods employed in organising for maximum economy and efficiency with modern types of transport machines may be gathered from this graph giving block-to-block speeds and times for different trip lengths with the Lockheed Fourteen. In its application the assumptions are made that five minutes will be spent in manœuvring below 500ft. at each end of the journey; that the climb is started at 500ft. (using an average power of 575 b.h.p. up to 12,000ft. at a true air-speed of 135 m.p.h.); and that the power descent is made at the rate of 300ft./min. The speeds given, of course, take no account of wind, the effects of which must be read off from another graph. In dotted lines on the left are the "best altitude" curves which are read off against the outer figures; for any distance greater than 225 miles it is preferable to climb to the optimum height.



side of the compartment, while the operator has a seat arranged athwartship. Beside and behind him is a case used for the carriage of those radio spares and similar items which may be needed. Proper electric lighting arrangements are made for the operator when he is working during the hours of darkness, and the neatly installed equipment carries a built-in table on which the log may be kept and any incidental navigation work carried out.

Performance Variations

Although the basic figures are given separately in the table to be found below, the varied performances which are available with the standard Fourteen are interesting enough to merit special attention. These different figures depend on the power which is being taken from the two Wright Cyclone F.62 engines, which are blown and geared to a ratio of 16:11. On the power output, of course, depends the consumption, and this output must be varied according to the weather conditions and the range attempted with different loads. Recently, it will be remembered, one of these machines was flown non-stop to and from Stockholm at an average over-all speed of 179 m.p.h.

LOCKHEED FOURTEEN
Two Wright Cyclone F.62 Engines

Span	65ft. 6in.
Length	44ft. 4in.
Weight empty	10,750 lb.
Provisional all-up weight	17,500 lb.
At 15,500 lb. all-up weight :—	
Still air take-off run with flaps (900 h.p./eng.)	670ft.
Still air take-off without flaps (900 h.p./eng.)	830ft.
Landing speed in still air with flaps	65 m.p.h.
Distance to clear 50ft. obstacle from standing start	1,925ft.
Distance to stop after clearing 50ft. obstacle	1,375ft.
Maximum rate of climb (760 h.p./eng.)	1,520ft./min.
Ceiling with one engine in full load	11,500ft.
Maximum speed at 7,000ft. (760 h.p./eng.)	245 m.p.h.
Cruising speed at 13,000ft. (550 h.p./eng.)	228 m.p.h.

The optimum cruising altitude with F.62 engines is 13,000 feet, but the best speed varies for different heights according to the amount of power which is being taken out of the engines. At sea level, for instance, the maximum speed (at a gross weight of 15,500 lb.) is 227 m.p.h., when 760 h.p. is being taken from each engine. The speed at the same power, but at 7,000 feet, is 245 m.p.h., which may be considered as the machine's maximum in normal operation, though another 140 h.p. is still available for take-offs and emergency use. The best speed figure when using 550 h.p. is that of 228 m.p.h. at 13,000 feet, while the best at 450 h.p. is 214 m.p.h. at 15,000 feet. The take-off rating of 900 h.p. is obtained at an engine speed of 2,350 r.p.m., while the normal rating at the same engine speed up to 6,600 feet is 810 h.p.—a power which may be used for emergency climb or other purpose during reasonably short periods of time.

A maximum fuel capacity of 644 American gallons (536 English gallons) is carried, and with this fuel load the machine has a range of 2,080 miles at a still air cruising speed of 184 m.p.h. In this case only 375 h.p. is being

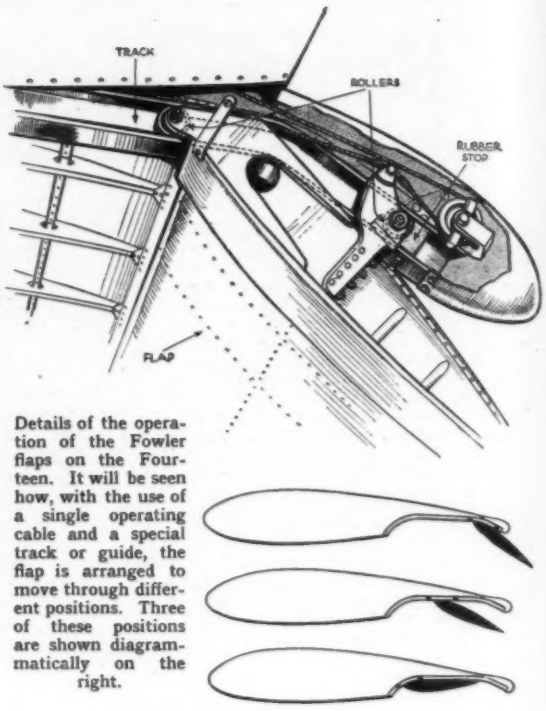
British Airways Fourteens are the first British machines to be fitted with the new Marconi streamlined D/F aerial, the casing of which will be seen just aft of the fixed aerial support. The "rails," which may just be discerned under the fuselage between the undercarriage legs, are part of the blind-approach aerial system.

taken out of each engine when flying at an altitude of 13,000 feet. At the same height, but at a cruising speed of 225 m.p.h., the range is 1,590 miles. In calculating these figures it is considered that ten gallons of fuel will be used in warming up the engines and a factor of 0.98 is used, in the formula concerned, to allow for range reduction due to the necessity for climbing to a suitable cruising altitude.

When allowance has been made for an average head-wind of 20 m.p.h. and for a fuel reserve providing a further three-quarters of an hour's flying, the ranges are 1,730 and 1,295 miles at speeds of 184 and 225 m.p.h. respectively. In all cases the ranges are calculated at the maximum all-up weight and are therefore to be considered as conservative, since this weight would, by the reduction of fuel, be considerably lessened during a trip.

By means of the various graphs issued by the Lockheed Corporation, one of which, for block-to-block speed calculation, is reproduced on p. 295, the pilots are able to get the best results out of the Fourteen and also be certain that in difficult conditions a terminal may always be reached with an ample fuel reserve for a return to another aerodrome if this terminal happens, after all, to be weather-bound.

These graphs give the variations in speed with altitude at different powers, the best gliding and climbing speeds, times and distances, the block-to-block times and speeds, and the effect of different winds on these speeds. It is interesting to know that the speeds and times of descents are calculated on a basis of 300 ft./min. in the interests of passenger comfort, and that the best climbing speed at cruising power is taken as being approximately 135 m.p.h.



Details of the operation of the Fowler flaps on the Fourteen. It will be seen how, with the use of a single operating cable and a special track or guide, the flap is arranged to move through different positions. Three of these positions are shown diagrammatically on the right.

A BLOHM and VOSS TORPEDO BOMBER

Internal Torpedo Stowage : Tubular Spar : Clean Undercarriage

THE latest German military aircraft of which details have been released is the Blohm and Voss Ha 140 twin-engined, twin-float general-purpose seaplane which can be used as a torpedo carrier, a bomber, or a long-range reconnaissance machine.

In layout the machine is a cantilever semi-high-wing monoplane of all-metal construction fitted with two 800 h.p. B.M.W. 132 nine-cylinder radials mounted forward of the centre section. The outer wing panels are of trapezoidal shape and are attached to the centre section by large threaded flanges.

The torpedo or bomb load is accommodated internally, being covered during flight by retractable shutters which protect it against the spray during take-off.

The twin floats are attached to the centre section by single tubular struts with large streamlined fairings.

As on all Blohm and Voss machines the wing structure was designed by Dr Richard Vogt. There is a tubular spar passing through the fuselage. This is of welded steel construction and serves as a fuel tank. Leading and trailing edges are detachable light-metal assemblies so that the controls are easily accessible The tubular spars for the outer panels are composed of conical riveted duralumin halves.

A novel feature is the aileron control, embodying a new rotary system whereby movements of the wheel are transmitted to revolving shafts geared to the ailerons.

Electrical operation is specified for the flaps. After switching on, the flaps are depressed to a preselected position.

There are two gun positions, the forward one being in the form of a revolving turret.

Data are : Span, 68ft. 10in.; length, 75ft.; height 18ft. 5in.; wing area, 941.8 sq. ft.; weight empty, 13,889 lb.; gross weight, 18,739 lb.; top speed (at sea level), 199; maximum cruising speed, 183; landing speed, 68 m.p.h.; climb to 9,840ft., 11 min. 30 sec.; service ceiling, 16,400ft.; normal range, 715 miles; maximum range, 1,553 miles.

The Ha 140 exhibits typical Blohm and Voss characteristics, e.g., twin rudders and single-strut float attachments.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

UNTIL further notice private flying in Germany has been forbidden by a decree issued last Monday by Field-Marshal Goering. The reason remains a mystery.

Last week the Japanese claimed that during their advance on Tienchiacheng their aircraft dropped 60,000 rounds of machine-gun and rifle ammunition and 100 packs of medical supplies and provisions for their troops.

The four Short Sunderland flying boats of No. 230 Squadron, Royal Air Force (Far East), have been named *Perak*, *Selangor*, *Pahang* and *Negri Sembilan*. They were purchased out of the $2,500,000 presented by the sultans and the peoples of the Federated Malay States for the acquisition of two new squadrons for the air defence of Malaya.

Twenty-five Years Ago

(From "Flight" of October 4, 1913.)

"Considerable excitement was caused at Neufchatel, near Boulogne, on Monday night when a German aviator on an Albatros monoplane landed. . . . He had started from Johannisthal with the intention of going to Bale, but after making a stop at Cologne, he was driven off his course to the northward, and eventually landed at Brussels. From there he arranged to fly across to Dover, but he once again lost his way and landed at Neufchatel to discover his whereabouts."

A SHORT ONE: The sign of the new inn overlooking the Medway at Rochester, named in commemoration of the first Empire flying boat to take the air. Representatives of Imperial Airways and Short Bros. attended the "launching" ceremony.

FOR TEACHING DOMINION DEFENCE: Two of the five Airspeed Oxfords recently ordered by New Zealand have been assembled and flown at Auckland. Mr. W. Locke, of Airspeeds, is seen (right) after the assembly test flights. The Oxfords will be attached to the F.T.S. at Wigram, the South Island headquarters of the R.N.Z.A.F.

An order for twelve transport aeroplanes has been received by the Lockheed Aircraft Corporation from the Netherlands East Indies Government.

The well-known Soviet pilot P. G. Golovin has recently completed a survey flight round the Polar basin, covering, it is claimed, 29,000 km. (18,125 miles) in 120 flying hours during 39 days. He used an N.207 monoplane.

At 3 p.m. on October 15 Marshal of the Royal Air Force Sir John Salmond is to open the first local H.Q. of the Air Defence Cadet Corps. This, a 32-room mansion in Watford, will accommodate Nos. 2 and 3 A.D.C.C. Squadrons.

The tower of the church of Notre Dame at Bruges was struck by a Belgian military aeroplane flying in a fog last week. The pilot was killed and the observer seriously injured, but, though the machine was carrying explosives, no explosion occurred.

The chief engineer of the Bristol Company's aero engine department, Mr. A. H. R. Fedden, M.B.E., F.R.Ae.S., M.I.M.E., M.I.A.E., M.S.A.E., Hon. F.I.A.A., Hon. D.Sc., has now been proffered a further honour. This is the Fellowship of the Royal Society of Arts.

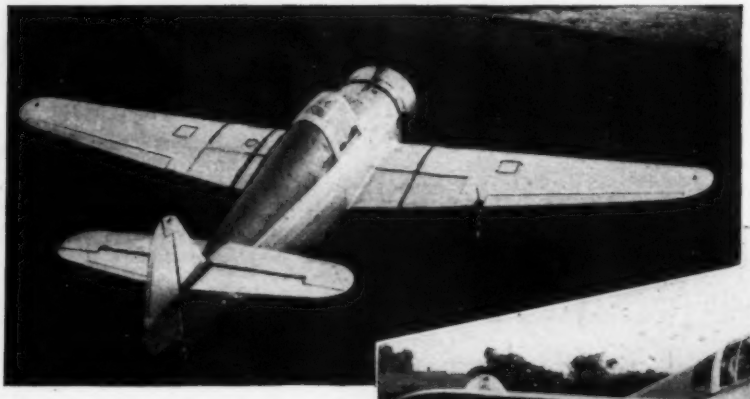
In the Statistical and Technical Review compiled by the Civil Aviation Department of the Air Ministry and published last week, it is disclosed that out of 15 accidents in 1937 which resulted in death or injury during private flying, six occurred to pilots of ultra-light aircraft which spun into the ground through loss of flying speed.

A pilot who lost his way while on a flight from Natal to Fort Victoria in Southern Rhodesia dropped a message at a Roman Catholic Mission station. The nuns in charge replied by making an arrow on the ground with newspapers and grouping the schoolchildren to form the figures "10," thus indicating the direction and distance.

When flying near Belgrave, Victoria, Australia, Mr. I. O. Brown, of the Essenden Aero Club, struck some high tension cables, breaking off pieces from each of his airscrew blades. In spite of this he was able to fly over 30 miles with his machine flying at just above stalling speed.

A.D.C.C. KIT: How officers of the Air Defence Cadet Corps will appear; Flt. Lt. H. Norvall displays the uniform. The colour is Air Force blue.

A 300 m.p.h. KOOLHOVEN FIGHTER



Offered to French Government: 1,080 h.p. Hispano Two-row Radial

A KOOLHOVEN F.K.58 single-seater fighter monoplane has lately been on test in France at Villacoublay following the offer by the constructors to supply machines of this type for the French Air Force.

The F.K.58 is of composite construction. The wing features two box spars, three-ply ribs and bakelite stressed-skin covering. The wing and retractable undercarriage form one independent unit which is attached to the fuselage by four bolts. Split aerodynamically balanced flaps are fitted and there is space under the wing for a long-range tank or a rack of light bombs.

The fuselage is of welded steel tube construction. From the engine to the back of the pilot's seat the covering is of sheet metal, but aft of this fabric is used. Decking is entirely metal.

Cowling as Wheel Fairing

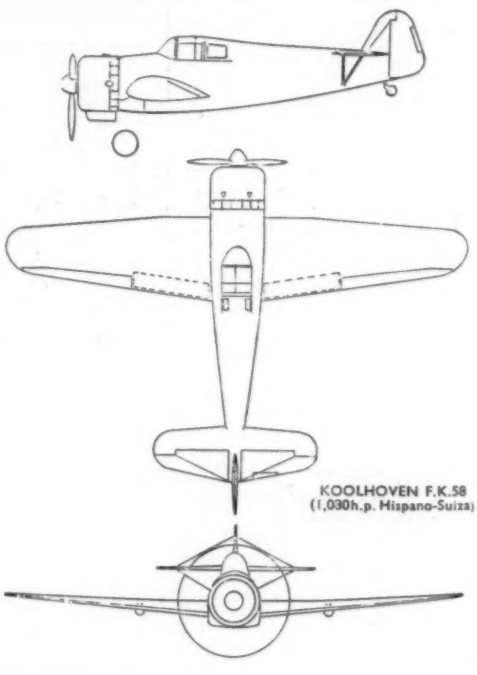
In the prototype the engine is an Hispano Suiza two-row radial giving a maximum output of 1,080 h.p. at 14,800 ft. The gilled cowling is so designed that it provides a fairing for the wheels when retracted. Within the wings are three fuel tanks with a total capacity of 111 gallons.

The undercarriage is in two independent halves, the wheels retracting inward into the belly of the fuselage. Koolhoven shock absorbers and Dunlop wheels and brakes are fitted.

A wooden tailplane and fin are used, but elevators and rudder are metal.

Armament comprises four fixed machine guns mounted beneath the wing outboard of the airscrew; these are fired hydraulically. Wireless apparatus and night-flying gear are included.

Data are: Span, 32ft. 8in.; length, 28ft. 6in.; wing area, 186 sq. ft.; weight empty, 3,990 lb.; wing loading, 30.2 lb./sq. ft.; power loading, 5.23 lb./h.p.; top speed at 14,740ft., 300 m.p.h.; cruising speed, 268 m.p.h.; stalling speed with flaps, 76.5 m.p.h.; range, 530 miles; rate of climb at 13,120ft., 3,210 ft./min.; climb to 22,960ft., 8.8 min.; service ceiling, 33,500ft.



Exchanging Views Internationally

THE annual congress of the Lilienthal Gesellschaft is being held in Berlin from October 12 to 15. The speakers represent many nationalities, notably Belgium, France, Germany, Italy, Great Britain and the United States of America. A very wide range of subjects is being covered, and includes papers on the aerodynamic, structural and operational aspects of flying, as well as on aero engines.

It is, perhaps significant that two important papers will deal with flying boat problems. Mr. Igor Sikorsky, the famous American designer, will read a paper on "The Large Flying Boat"; Mr. Garner, of Felixstowe, will give an account of "New Tests with Flying Boats and Flying Boat Models."

Mr. Fedden will, very appropriately, read a paper on "The Development of Sleeve-Valve Engines," a subject in which he has taken a leading part.

Great interest is sure to be shown in the paper which is to be read by Dr. Ernst Heinkel, entitled "The Increase of Aircraft Speeds During the Last Few Years." Dr. Heinkel has done much towards increasing the efficiency of aircraft and thus making higher speeds possible for a given horse-power.

The subject of automatic control of aircraft will be receiving considerable attention, several papers being devoted to it.

Air Minister to Visit Chelsea College

SIR KINGSLEY WOOD, Secretary of State for Air, will pay his first official visit to the College of Aeronautical Engineering at Chelsea on Friday, October 14. Sir Kingsley, who is due to arrive there at 11 a.m., will be received by the Principal, Mr. C. H. Roberts, and Members of the Advisory Council.

A complete tour of the College has been mapped out for a two hours' visit, during which Sir Kingsley will inspect engine shops and will see students under instruction.

PRIVATE FLYING

SEAPLANE RECORD-BREAKER: In the hands of Herr Helmut Kalkstein, this Klemm 35 recently broke five records for seaplanes in the single and two-seater classes. As a single-seater the machine reached a height of 7,000 metres (22,966ft.), flew over a 100-km. course at an average speed of 228.705 km/h (142.1 m.p.h.) and over 1,000-km. course at 227.748 km/h (141.51 m.p.h.). As a two-seater it reached a height of 5,600 metres (18,373ft.) and covered the 100-km. course at 227.704 km/h (141.48 m.p.h.).

Topics of the Day

The Market

ONE of the minor mysteries in the world of amateur and club flying concerns the extraordinary difficulty experienced in selling light aeroplanes which, if not perfect, at least have possibilities. During the past few years a dozen single-seater and two-seater lightweight prototypes must have been made, yet not more than two or three, at the very outside, have even been put into one-at-a-time production.

At this very moment there is in existence at least one thoroughly satisfactory single-seater type, yet not even one of these has yet been sold. It is easy to say that the market for the single-seater is very limited, but the fact remains that a single-seater which was produced quite a number of years ago (the Comper Swift) sold in very reasonable quantities. This, furthermore, was a comparatively expensive aeroplane, and there were, at the time when it was first produced, far fewer amateur pilots capable of flying such a machine.

At least part of the reason for sales failure, among lightweights at least, must be the fact that there are so very few suitable engines available and being made by reputable firms. Time after time one hears of single and two-seater prototypes being put down immediately after a test take-off because, for some reason or other, the engine has either stopped entirely or lost so much power that it is not possible to maintain height. In this country no manufacturer has seriously got down to the business of producing a satisfactory engine in the very small class. Two engines of likely merit are in the process of production in the half-century class, and above that size, of course, the prospective designer has (or will have) little difficulty in obtaining what he wants.

It seems impossible to believe that almost the only really reliable and useful engine of very small power is one that is virtually a very slightly modified car engine. One might almost be justified in suggesting that nobody can ever really have tried to produce a suitable engine of, say, 20-30 h.p., designed solely for aircraft work.

Up to a point, this statement would be quite true, since, though a few engines have been designed and built, nobody seems to have had the patience to try to make them work properly.

At least two of them were, originally, modified and essentially unsuitable motor cycle engines, and two others, slightly larger units, were foreign engines built under licence. It is significant that the foreign pair had to be grounded and modified almost as soon as they were passed as satisfactory and put into small-scale production.

Conservatism Again

ANOTHER possible reason for this lack of sales is that the owner and club are very naturally conservative about the machines which they buy. They want to know not only that a new type is well designed and well built, but that spares will be forthcoming and that the second-hand price will not drop with a bump just as soon as the machine is taken over. Consequently, the success of types in the smaller classes depends almost entirely on the support given to these classes by the bigger and more reputable manufacturers. Any new concern must, it seems, expect to wait two or three years before prospective buyers will take their machines seriously—unless, of course, Air Ministry contracts are obtained, or they are otherwise shown to be thoroughly reliable.

Two or three smaller firms which have partially beaten this bogy—in some cases only to fade out when success was almost achieved—can be cited. In each the sales efforts were unremitting, and the machine in question was taken everywhere and eventually, if slowly, and in "subconscious sales" manner, impressed the flying public with its suitability and with the stability of the firm building it. In theory the C.A.G. scheme should almost immediately have given a few orders to some of these smaller concerns, but, in fact, conservatism again has stepped in, and the clubs and schools are tending to wait, not unnaturally, for the types which are being produced by well-known firms.

One exception, at least, can be given, but in this particular case the firm, though comparatively new, is building a machine which is morally backed by one of this country's biggest aircraft manufacturers—though it must be admitted that this manufacturer has not built a single civil machine in the course of his existence.

The small aeroplane is, it appears, unlikely to get anywhere at all so long as it is handled only by people who were previously unknown and have little financial or historical backing. Which is a pity; but the same sort of thing seems to apply to the small car trade, which is now virtually in the hands of less than half-a-dozen really big manufacturers.

More Details

THERE has always been a tendency among the designers of British light aeroplanes to forget certain little points which can become very important to an owner or hirer who is making real use of his machine. One of the very latest types, for instance, has no provision whatever for picketing, and the same applies to quite a number of otherwise good aeroplanes.

Admittedly, the need for such features does not often arise, but when it does this need is very great indeed. When I was in the Isle of Man for the air race at Whitsun I noticed that quite a large percentage of the competing machines had to be tied down by the most ingenious but surely unnecessary methods. The circuit races were can-

celled on the Monday because the wind was gusting up to something like 50 m.p.h. at ground level. Obviously, it was necessary that the machines, some of them very special racers, should be picketed down as securely as possible. This would have been easy enough if there had been handling devices, but it was extremely difficult in cases where no such means for securing the cords were available.

On this occasion, of course, the competitors had all the expert help they could have required, and a great deal of the work was, in any case, done while they themselves were safely in bed. But what of the owner who is forced down by weather in some field and is compelled at once to think out some method by which his machine can be prevented from blowing away? We have all heard of pilots who have landed in such conditions and have had to spend an entire uncomfortable night in or near the machine—occasionally, perhaps, starting the engine in a wild endeavour to prevent an expensive catastrophe.

INDICATOR.

FROM the CLUBS and SCHOOLS

Flying and Social Activities: C.A.G. Progress

LONDON

THE flying time for the week ended October 1 was 97 hr. 30 min. Mr. J. H. Weaver made his first solo.

REDHILL

Mr. C. L. Armstrong has qualified for his "A" licence, and Messrs. G. E. Mason, J. K. Falconer, Capt. H. V. Jellicoe, and Mrs. F. Fitzgerald carried out their first solos. A total of 144 hours was put in for the week up to October 1.

MARSHALL'S

Mr. Moody has joined the instructional staff of Marshall's Flying School, and 80 hours flying was done last week. Cross-country flights were made to Grimsby and Hanworth. In the C.A.G. side a good attendance is being maintained by members, and Mr. Spittle has qualified for his "A" licence.

PENANG

An active programme for September and October has been followed by the Penang Flying Club. Rain has held up flying on a good many days, but a total of 109 hr. 10 min. was logged for August. A gymkhana was held on August 28 when two hundred members and friends turned up and a flying display was given.

EDINBURGH

The weather during the week ended September 23 was continuously bad and flying was possible during only half the period. The Club's flying total was 6 hours and the C.A.G. training and solo total was 11 hr., 10 of which was dual There were five visiting machines, and ten airline passengers passed through Macmerry.

NORFOLK AND NORWICH

Forty-four hours were flown by pilots and pupils of the Norfolk and Norwich Aero Club, and Mr. G. R. Gallant made an excellent first solo. A party of the members of the Women's Branch of the Conservative and Unionist Association visited the aerodrome and were flown in the club machines. Thermal currents were noticeably absent and gliding suffered thereby. The annual ball arrangements were held up by the recent crisis, but tickets are now obtainable.

NEWCASTLE

At present the Newcastle-on-Tyne Aero Club have 54 C.A.G. pupils under instruction and were, last week, merely awaiting the return of 61 medical assessments from the Air Ministry before this number could be increased. Three new machines are being purchased and a further three reserved. For the moment only three instructors are employed. Since standard type machines are used, the C.A.G. instructional and solo flying charge is fixed at 5s. an hour at all times during the week.

READING

C.A.G. flying is in full swing, 51 members having come through. Two new members have started instruction.

STRATHTAY

During the week ended September 25 the Strathtay Aero Club put in a total of 34 flying hours, of which the C.A.G. members accounted for 15. Mr. A. C. Melville has passed his "A" licence test.

ISLE OF WIGHT

Excellent progress has been made by the C.A.G. members during the last month, and "A" licence tests were completed by Mr. M. Bennam. Winter parties will start on Saturday, October 8, and the clubhouse is being repainted in readiness. Fifty-two hours were flown last month.

BARTON (BEDS)

A cross-country flight to Leamington was included in the flying total of 256 hours for September, and Mr. E. W. Carmichael obtained his "A" licence. A dance, for normal and C.A.G. members, was held last Saturday.

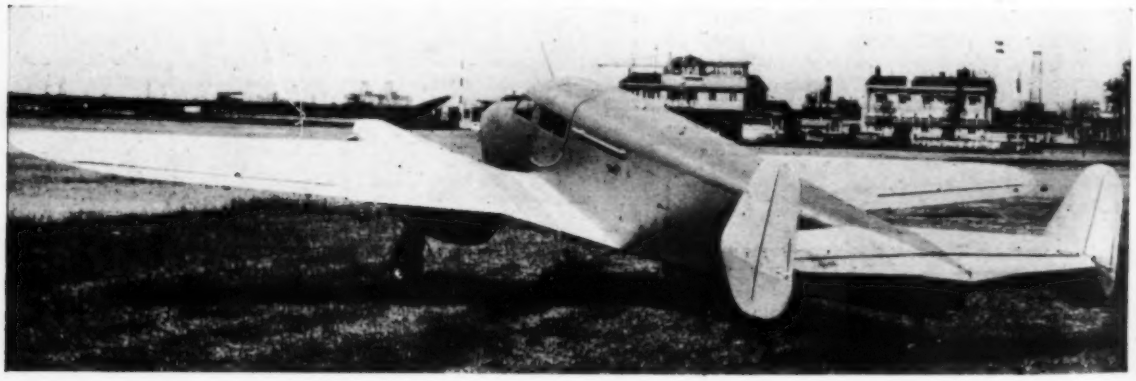
NORTHAMPTONSHIRE

With the additional claims of the C.A.G. the Northamptonshire Aero Club machines are, of course, constantly in demand. Last week four new members joined. The Club's annual ball will be held on October 14 at the Salon de Danse, Northampton.

BROOKLANDS

No fewer than 44 new flying members were elected at the committee meeting last week, and during the past month unparalleled activity has been apparent. One hundred and thirty hours were flown and the instructors are kept busy from dawn to dusk. First solos have been made by Messrs. Dunlop, Don and Stephan, the latter also completing his "A" licence tests with Messrs. Tose and Maunde. Mr. R. Symondson has been appointed to the instructional staff. He was formerly a member of the club and took his "B" licence training there. A demonstration of the Mosscraft was made by Mr. W. H. Moss on Sunday, and senior pilots had an opportunity of flying the machine. A representation went to Bournemouth Dawn Patrol, but as the weather had washed out the defences they all obtained free breakfasts. Next Sunday, a treasure hunt in cars will be made.

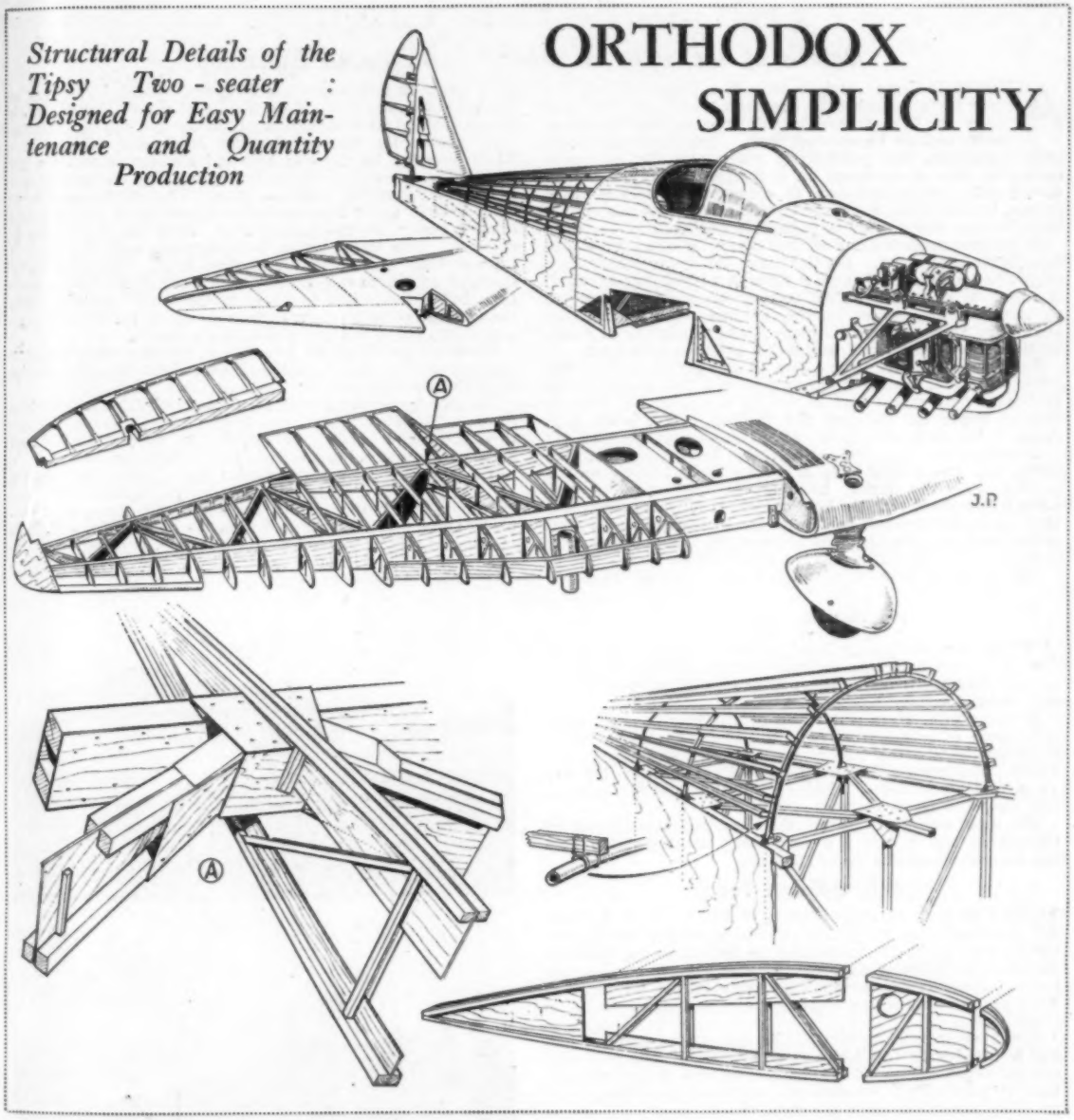
Arrangements for the formation of an Air Defence Cadet section are in hand; a provisional committee has been appointed, and Major F. G. Maunde-Thompson has agreed to become commandant. Local young men, between the ages of 14 to 18, who wish to join are asked to get in touch with Capt. Duncan Davis. Meanwhile, donations are required to provide the capital necessary to launch the scheme.



LUXURY SPECIAL: Designed to special order this Koolhoven FK-57 has a cruising speed of nearly 170 m.p.h. and a normal range of 900 miles. Further details are given on page 302.

ORTHODOX SIMPLICITY

Structural Details of the Tipsy Two-seater : Designed for Easy Maintenance and Quantity Production



Some self-explanatory details of the Tipsy two-seater in partially constructed form. The fuselage and wing are shown above, with details of each in enlarged form. The section at "A" is interesting in that it shows the way in which the plywood webs are sandwiched between the spruce members of the diagonals and of the ribs, with box stiffening at the joints.

ON the face of it the Tipsy two-seater, which was described from the pilots' and owners' angle in *Flight* of August 11, 1938 (and previously after its original introduction to this country), is of orthodox wooden construction, with a part plywood-covered fuselage and fabric-covered wing. When the details are examined, however, it is seen that a great deal of attention has been paid to incidentals, so that the machine shall be both cheap to make and easy to maintain.

The original model was designed by Mr. E. O. Tips, of Avions Fairey, and the British company has been responsible for various modifications which have been made to the production machine. These have included changes to the design of the wing which now has an increased taper and wash-out; the mass balancing of the ailerons, elevator (by the use of counterweights in the leading edges), and rudder; the addition of flap gear; and certain other modifications of production interest.

The wing has two main spars with a ply-covered leading edge and pyramid bracing between these spars to provide torsional stiffness. The leading edge is stiffened where necessary, and as shown in the drawing. The wing is built in one piece and is attached to the fuselage at four points. The fabric is attached without stringing. The front spar and flush rib flanges are coated with glue before the fabric is put on, and the area covering each rib is then painted with "thinners" before pressure is applied by means of a roller.

The fuselage is of the conventional ply-covered box type in which the transverse bracing is provided by a frame of spruce members in front of and behind the cockpit. The upper longeron is at the waistline, and the top part of the fuselage consists of light alloy half hoops and stringers covered with fabric. This fabric is also applied in a special way, and is partially sewn up in a bag before being pulled over the fin—so providing a natural fairing at the base of the fin, which is part of the main fuselage structure.

The undercarriage construction is extremely simple, the steel cylinder which carries the springing and damping rubbers being bolted directly to the front spar. A square section of the leg runs through a duralumin block which is bolted into the bottom of the cylinder, and rubber pads, with alloy discs between them, are compressed between this and the top of the cylinder, through which the leg passes. Rebound stresses are taken by another rubber pad above the cylinder.

Private Flying

THE NEWEST CESSNA

Details of the 1939 Airmaster : All-round Efficiency

ALTHOUGH Cessna designs have been appearing year by year for a considerable number of years, it was only when the C.34 arrived in this country that the name really became known over here. This high-wing cantilever monoplane was particularly remarkable for its extraordinarily high performance on a comparatively low power, though this performance was, to some extent, paid for in a certain lack of cabin space, and the machine had one or two little features which could be justifiably criticised.

In the later models many of the reasons for minor criticisms have been cleared up. For instance, the flaps, which were originally operated mechanically through a bevel gearing which involved a quite incredible number of manual turns on an inconveniently placed handle, are now operated electrically. The view has been improved, and a number of modifications have been made to provide easier maintenance.

The 1939 Airmaster Cessna has all the performance of the original C.34—it cruises at 151 m.p.h. with four people, while taking out only 75 per cent. of the 145 h.p. available from the Warner Super Scarab—and the landing speed, with flaps down, is less than 50 m.p.h. As in the case of the majority of American machines, special attention has been paid to the finish, and this undoubtedly has some slight bearing on the performance. The latter, however, becomes more obvious when it is realised that the landing gear is fully cantilever and that the leg fairings not only enter the fuselage smoothly, but at the lower end are arranged to cover the wheel brakes and, in fact, to run smoothly into the wheel shape.

The track is, however, more than 7ft., and the regulated oleo legs have a movement of 6 inches. Ground handling in the latest machine is aided by the use of tail-wheel lock which permits this wheel to remain at will in the fore and aft position.

As before, the fuselage structure is of steel tubing, with fabric covering for the rear half and aluminium covering for the portion forward of the landing gear. The entire structure is corrosion-proof for seaplane work. The wooden cantilever wing is built up of two laminated spruce spars and is fabric covered except for the leading edge, which has a covering of plywood. The wing section is NACA2412, and the wing is tapered both in thickness and plan form. The electrically operated split flaps stop automatically in their fully down position, but if the switch is moved to the "off" position while the flaps are going up or down they remain in the selected position. The entire tail group is fully cantilever.

There are no structural members to interfere with the view through the one-piece moulded screen, which curves backward through 180 degrees.

The standard equipment in the Cessna includes a wind-driven generator, an electric starter, a metal airscrew, Grimes navigation lights, and bonding for radio. The useful load is about 1,000 lb., leaving ample reserve for baggage and extras.

The basic figures are as follows: Span, 34ft. 2in.; length, 24ft. 8in.; gross weight, 2,350 lb.; weight empty, 1,380 lb.; maximum speed, 162 m.p.h.; cruising speed, (at 75 per cent. power and 8,200ft.), 151 m.p.h.; landing speed, 49 m.p.h.; rate of climb, 1,000ft./min.; and cruising range, 525-785 miles. In this country the Cessna is handled by Surrey Flying Services at Croydon Airport.

Cambridge Opening

AFTER some temporary doubt during the past week it has now been definitely decided that the official opening of the new Cambridge aerodrome will be carried out next Saturday by Sir Kingsley Wood.

At 12.30 p.m. there will be an official luncheon, to which only those with invitations will be admitted, and thereafter there will be a flying programme lasting about an hour and a half. Visiting machines are requested not to arrive between 13.30 and 16.30 hours, when this display and the opening ceremony will be in progress.

The new aerodrome is on the Newmarket road out of Cambridge, and is only a comparatively short distance from the disused aerodrome at Fen Ditton.

A Long-Range Tourer

BUILT to meet the requirements of Mr. J. E. F. de Kok, the Koolhoven FK-57 recently demonstrated its capabilities by making Ypenburg-Brindisi on September 22, Brindisi-Baghdad the following day, and reaching Karachi on the 24th. On the 25th the international situation caused Mr. de Kok to decide to return, and the journey was again made in three days.

The machine is of typical Koolhoven wooden construction, and is fitted with two Series II Gipsy Sixes. The gull wing (as embodied on the Koolhoven Junior and FK-56 military trainer) is claimed to combine the structural simplicity of the low-wing monoplane with the stability and handling qualities of the mid-wing layout. The cabin seats four in great comfort. A lavatory and luggage hold are arranged to the rear.

Data are: Span, 43ft. 4in.; length, 30ft.; wing area, 260 sq. ft.; top speed (sea level), 178 m.p.h.; cruising speed (6,000ft.), 168 m.p.h.; landing speed, 65 m.p.h.; range (normal), 900 miles; range (with extra tanks), 1,245 miles; and service ceiling, 15,250ft.

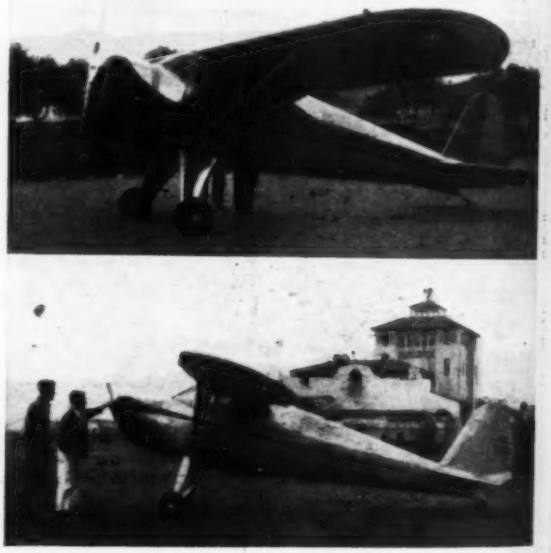
Civilian Statistics

WHEN the *Annual Report on the Progress of Civil Aviation in* 1937 was issued it was explained that the statistical and technical material would this time be published in a separate volume. This volume has now appeared from H.M. Stationery Office and may be considered as the second half of the original *Report*, which consisted of descriptive matter.

This technical review is divided into two parts, the first of which covers civil aviation in Great Britain and the second part the progress of Empire and world services, while appendices give details of the services and fleets in the Empire.

Altogether Imperial Airways and its associated companies, for instance, flew more than 5,700,000 miles and carried nearly 65,000 passengers during 1937. The passenger mileage on the routes showed a considerable increase (from 27,900,000 in 1936 to 35,400,000 in 1937), while, not unnaturally, the mail ton-mile figure showed an even more marked increase—from 1 794,000 to 3,637,000. The equivalent mail increase in tons was from 341 to 667. On internal services alone the increase was from 390 tons to 500 tons.

In the whole Empire the number of licences current at the end of last year was 7,552 ("A") and 1,955 ("B"), while 3,197 civil machines were registered, of which 479 were employed by transport companies. The regularly operated air routes throughout the world, ignoring duplications by different countries, totalled about 33,500 miles. Approximately 200,000,000 miles were actually covered in operation, of which 32,310,905 miles were flown on services within the British Empire. The "5" at the end of this figure gives a delightful indication of statistical accuracy.



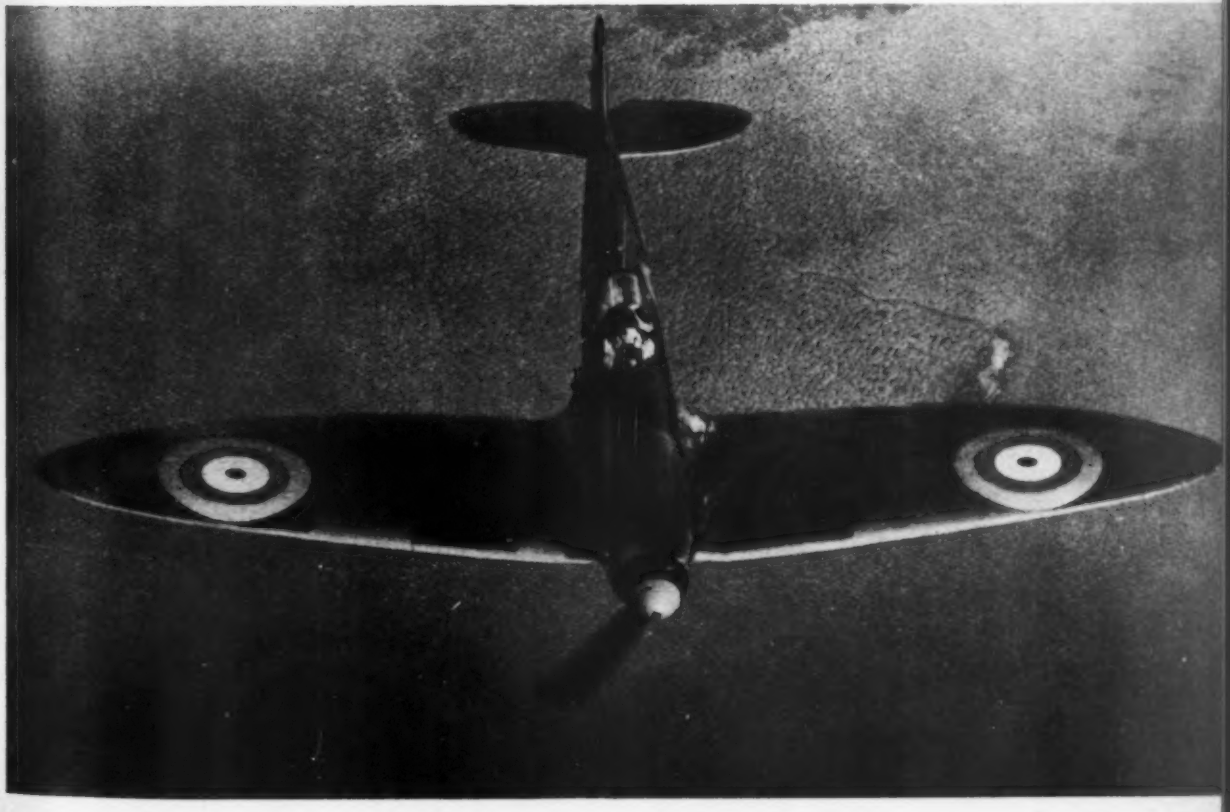
TWO NEW LUSCOMBES : Designed for quantity production and with many interchangeable parts, these two Luscombe models are primarily interesting because they show the way in which metal construction is appearing amongst even the smallest types in America. That below is powered by a 50 h.p. Continental, and the other by a 90 h.p. Warner Radial. Both are two-seaters and have been given their A.T.C. — the American C. of A.

BRITAIN'S FIGHTERS

THE events of several fateful days last week stimulated public interest in our defensive aircraft. The two latest types to go into service—the HAWKER HURRICANE (top) and the SUPERMARINE SPITFIRE (below)—are illustrated on this page. Although performance and armament of the SPITFIRE are still secret it is known that the HURRICANE has a maximum speed of 335 m.p.h. and that it carries eight Browning machine guns mounted in its wing.

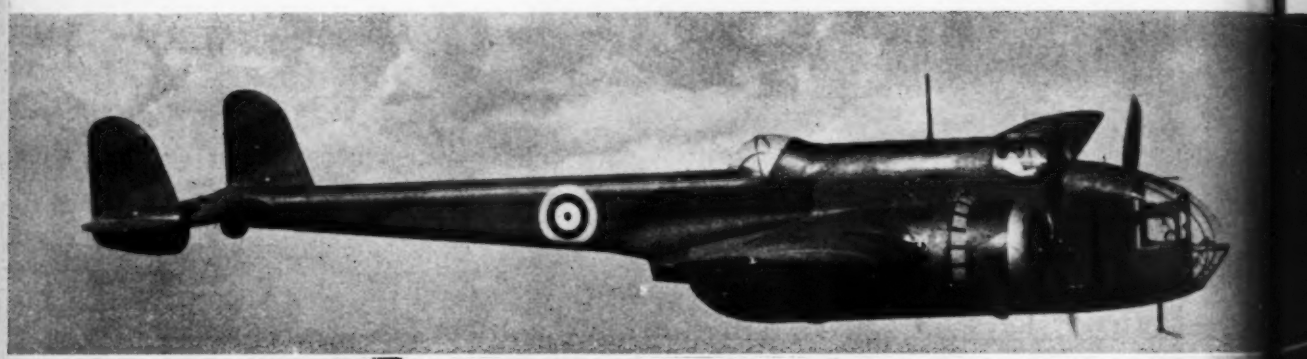
The engine of both types is the Rolls-Royce Merlin II of 1,050 h.p. It is to this engine that the Royal Air Force owes much of its superiority in the air. No other nation has such an advanced liquid-cooled unit in service.

In accordance with current Air Ministry practice, both machines are camouflaged in "sand and spinach" with matt black under surfaces.



OUR BOMBERS

ON this and the opposite page are illustrated six standard types of bombing aircraft as used by the Royal Air Force. The Fairey Battle (top left) has a single Rolls-Royce Merlin engine; the Handley Page Hampden (two Bristol Pegasus) follows the Harrow (bottom) as the standard production type at the Handley Page works; the Bristol Blenheim (top right) is still the fastest twin-engined bomber in standard use in any air force; the Armstrong Whitworth Whitley is a very sound and well-defended type in the heavier category, and the Vickers Wellington (bottom right) is built on the geodetic principle of construction, which confers high load-carrying capacity and long range.



COASTAL DEFENCE

——is represented by these attractive studies of Avro Anson general reconnaissance monoplanes (top) and Vickers Vildebeest torpedo bombers. The Vildebeest has great hitting power and the Anson is highly efficient as an economical type for such duties as anti-submarine control and convoy work.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

R.A.A.F. EQUIPMENT

Scope for a Multi-purpose Twin-engined Type?

I HAVE read with a great deal of interest Mr. H. F. King's informative articles on Australian aviation, particularly that dealing with the R.A.A.F.

It appears to me that Australia would do well to concentrate on a multi-purpose twin-engined machine on the lines of the Potez (the 63, I believe) which could be employed for bombing, fighting, reconnaissance and Army co-operation work.

But perhaps similar designs are now under way in this country? W. J. A.

London, N.W.2.

TIGER MOTHS IN RHODESIA

Performance at Altitude

IN reply to Mr. F. N St. Barbe's letter in your issue of September 1, I should like to state that I did not, from my last letter, wish it to be inferred that the figures I gave were general for the Tiger Moth. I hold the merits of that machine in high esteem, and would like to point out that those figures were obtained under *abnormal* conditions. My idea was to show how these conditions affect the performance of an admirable machine. This will readily be realised, as a Tiger Moth belonging to the Bulawayo Light Plane Club set up a new altitude record of 20,000ft. only this week. Climatic conditions for that flight were undoubtedly good.

There is a lot of talk going on in South Africa at the present time concerning the qualities of a certain Continental aerobatic and training machine, but, so far, the Tiger Moth leads the field, and looks like continuing to do so for some time to come. A. D. SHAW.

Kitwe, N. Rhodesia.

THE BALLOON BARRAGE

Some Criticisms of Recruiting Methods

NOW that the crisis has passed perhaps it may be opportune to offer a few criticisms of the balloon barrage and its recruiting methods. This section of the A.A.F. is obviously very short of personnel. It may be that lack of knowledge of its function, scepticism as to its practicability and absence of details appealing to the average patriotic man all combine to detract from enthusiasm to join.

The fact that has amazed me is that in and around London must be large numbers of men who served in kite balloon sections during the war or at the training depots at Roehampton, Richmond Park, Lydd, and even the balloons attached to the Camouflage School, Kensington Gardens. In addition, I have reason to believe there is a goodly number of able-bodied officers, including one of high rank, with long valued service, who served for years during the war with the kite balloons (and also including some, no doubt, who were attached to the "Drain") living in and around London who would and could give their services and detailed war-time knowledge of Caquot balloons. Why has no appeal been made to these officers and men? Without appearing to be an armchair critic it would seem from my own observations to-day that it would be an advantage to have the help of officers who have sat in the basket of a Caquot balloon in London day after day from heights of 100ft. to 5,000ft. and have some experience of the eddies over trees and buildings and their effect on nose-diving when the nose has got flabby due to loss of hydrogen after a period in the air.

Another factor which to my mind detracts from recruiting is the fact that the depots are spread as far apart as Kidbrooke, Chigwell, Hook and Stanmore with no intervening areas for training. I suggest that areas be found in London and the suburbs where one balloon, winch, and all accessories be kept and training be given, say, on two nights a week with the opportunity for two hours on Sunday morning. These men could be posted to their nearest squadron but could do their training at these local depots. Then later, say, once a fortnight, they could do squadron training. Rigging, fabric repairing, winch-running, etc., can be taught in a small area.

Surely the mobilisation of the balloon barrage has shown sufficient defects to call for something drastic to be done. As just one instance, I recently saw a lorry with loaded hydrogen cylinders unattended, and civilians knocking their pipes out on the lorry.

I write these lines in the spirit of helpful criticism of a branch of the R.A.F. in which I proudly spent two years during the last war. MAURICE E. STUTCHFIELD.

London, W.C.2. (Late Nos. 9 and 15 Sections, France, and Instructor at No. 2 Balloon Training Depot.)

C.A.G. CORNER

A Last Word

YOUR correspondent Mr. Whittard (September 22), in his reply to Mr. Arrow (September 8) and myself, also seems to have missed the point.

It is not a question of any single individual being "lost in the crowd," but of that great number of individuals who, having through their own enthusiasm and out of their own pockets, obtained their "A" licences, are now faced with a virtual cessation of their training (which now should be more advanced) due to no scheme or arrangements having been made for them.

Competition will not produce quantities of *efficient* pilots under the present scheme, as the attainment of the "A" licence merely indicates that the holder is capable of taking a machine off the ground and getting it down again in one piece—by no means is he an efficient pilot and will not be one until he has passed through advanced training.

The 40 per cent. (mark this) "something for nothing" people are obviously not motivated from patriotic feelings or interest in flying for itself, otherwise they would have "taken up" flying before this subsidising scheme, knowing that efficient private pilots would undoubtedly be of value in time of emergency.

If these people felt at any time the call of patriotism they would undoubtedly have joined some form of reserve or territorials and not suddenly felt this noble urge when there appeared "something for nothing"—this is the primary thing which has apparently aroused their interest.

As I previously indicated, good luck to the scheme, but do something practical in the way of assistance for those who at inconvenience and, in many cases, expense which could not really be afforded, took up flying and obtained their licences, realising that in an emergency they would be of greater value than the untrained man and would probably be among the first to be called upon by the Government.

London, S.E.2. MEMBER No. 50,
Civil Aviation Service Corps.

[We feel that the above should be the last word on this particular aspect of the subject. The controversy appears to be going round in a circle.—ED.]

Forthcoming Events

October 8. Opening of new Cambridge Aerodrome by Secretary of State for Air.

October 12-15. Lilienthal Gesellschaft: Annual Congress, Berlin.

October 14. Northamptonshire Aero Club: Annual Ball, Salon de Danse, Northampton.

October 15. South Coast Flying Club: Annual Dinner and Dance, Grand Hotel, Brighton.

October 20. R.Ae.S. Lecture*: "Light Alloys in Aircraft Construction," by M. le Coeuvre.

November 3. R.Ae.S. Lecture*: "The Meteorological Problem of the North Atlantic," by Capt. F. Entwistle, B.Sc.

November 9 (Wednesday). R.Ae.S. Lecture*: "American Aircraft," by T. P. Wright, F.I.Ae.S., F.R.Ae.S.

November 17. R.Ae.S. Lecture*: "The Work of the D.V.L.," by Dr. F. Seewald.

November 18. Brooklands Four-club Annual Dinner and Dance, Grosvenor House, London.

November 18 - December 4. Paris Aero Show, with Air Transport Congress.

December 1. R.Ae.S. Lecture*: "Flying Controls," by Prof. G. T. R. Hill, M.C., M.Sc., F.R.Ae.S.

December 15. R.Ae.S. Lecture*: "Some Results from the Deutsche Forschungsanstalt für Segelflug Smoke Tunnel," by Herr A. Lippisch, A.F.R.Ae.S.

* All these Lectures take place at 6.30 p.m., at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1.

SERVICE AVIATION

"Flight" photograph.

VICKERS WELLINGTON long-range bombers (Pegasus) awaiting test at Brooklands. The crankcase cowlings are interesting.

Royal Air Force and Official Announcements : *Fleet Air Arm News : Military Aviation Abroad*

Air Aide-de-Camp to the King

THE Air Ministry announces the appointment of Group Captain John Cannan Russell, D.S.O., as Air Aide-de-Camp to H.M. the King in succession to Air Commodore Keith Rodney Park, M.C., D.F.C., who relinquished the appointment on promotion to his present rank on July 1, 1938.

Recruiting Returns

LAST week, the fourteenth week of the R.A.F. recruiting campaign for 31,000 pilots, observers, airmen and boys, 482 men were enlisted, making a total of 7,730 since the campaign began. During the week there were 2,220 applications for the various classes.

Sir Kingsley Wood Appointed Honorary Air Commodore

THE Air Ministry announces that His Majesty the King has been pleased to approve the appointment of the Right Honourable Sir Kingsley Wood, M.P., Secretary of State for Air, as Honorary Air Commodore of No. 901 (County of London) (Balloon) Squadron, Auxiliary Air Force.

It is peculiarly fitting that the present Secretary of State for Air should be appointed Honorary Air Commodore of this Squadron, which is stationed at Kidbrooke, Woolwich, London, S.E. He was member of the London County Council for Woolwich from 1911 to 1919. He has represented Woolwich West in Parliament since December, 1918.

No. 901 (County of London) (Balloon) Squadron is commanded by Squadron Leader J. S. Wheelwright, D.S.C.

Class "C C."—Reserve of Air Force Officers

AS from May 7 last, retired, reserve and ex-officers employed as civilians with the Royal Air Force, who are required to exercise executive command under the Air Force Act and to wear uniform will be appointed to commissions in a new class of the Air Force Reserve, designated Class "CC."

As reserve officers they will be subject to the Air Force Act at all times. The conditions of employment of Class "CC" officers will remain on a civilian basis as indicated in the officer's original letter of appointment.

Retired and ex-officers will be appointed in the rank appropriate to the substitution post which they are filling and will be given honorary rank corresponding to any higher substantive rank held during previous service in the Royal Air Force.

The current engagement of officers of the reserve in another class of the reserve will in no way be affected by their appointment to Class "CC." Those holding substantive rank below that appropriate to the substitution post they are filling will be appointed in the same substantive rank as that which they hold in another class of the reserve, but acting higher rank will be granted to such officers for the sole purpose of their appointment in Class "CC." Such acting rank will carry no executive command while officers are performing duties in their capacity as officers in another class of the reserve.

The use of the designation "pro-forma" commissions in connection with these appointments will be discontinued forthwith.

Bases in Nova Scotia

WORK on new aerodromes at Halifax and Yarmouth in Nova Scotia has been speeded up, giving rise to reports that they would be used for the take-off of Canadian-built bombers flying to England. There is a rumour that the machines would also use aerodromes at Trenton and at Sydney, where aerodromes are now being laid out. All four aerodromes are being equipped with facilities for handling aircraft of the heaviest type.

Gallantry in Waziristan

THE following rewards in recognition of gallant and distinguished services rendered in connection with operations in Waziristan, 1938, were published in the *London Gazette* of September 13:—

D.S.O.—Sqn. Ldr. B. E. Embry, A.F.C.

D.F.C.—F/O. (Acting Flt. Lt.) T. B. de la P. Beresford and F/O. L. E. Cryer.

D.F.M.—L. A/C.s L. H. Thomas and G. A. Watson

Balloon Barrage Age Limit Lowered

AN Air Ministry announcement last week stated that the age limit for enrolment in the Balloon Barrage Squadrons of the Auxiliary Air Force has been lowered from 38 to 25 years and that applications were urgently invited for men between that age and the age of 50. The conditions of service are in general the same as those for the aeroplane squadrons of the Auxiliary Air Force. Applicants in receipt of disability retired pay or disability pensions cannot be accepted.

The recruits are required for various duties in connection with balloon operation and maintenance. The technical trades of the balloon squadrons include those of balloon riggers, fabric workers, lorry and winch drivers, and hydrogen workers.

The following Balloon Barrage Squadrons are open for recruitment, and application should be made, by letter or in person, direct to the commanding officers of any of the squadrons respectively located at the following balloon centres—Nos. 901, 902, and 903 (County of London) Squadrons, No. 1 Balloon Centre, Kidbrooke, S.E.; Nos. 904 and 905 (County of Surrey) Squadrons, No. 2 Balloon Centre, Mansfield Road, Hook, Surbiton, Surrey; Nos. 906 and 907 (County of Middlesex) Squadrons, No. 3 Balloon Centre, Stanmore Park, Middlesex; Nos. 908, 909, 910 (County of Essex) Squadrons, No. 4 Balloon Centre, Chigwell, Essex.

SERVICE AVIATION (CONTINUED)

Offers of Service during the Crisis

OFFERS of service in various capacities in the Royal Air Force and its volunteer organisations were received at the Air Ministry in very large numbers last week. Applications to join the Royal Air Force ex-Officers' Emergency Reserve were especially numerous.

In addition, offers of help in emergency were received in large numbers from individuals and business undertakings willing to put their experience and resources at the disposal of the Air Ministry.

In an announcement the Air Ministry says that it greatly appreciates the public spirit which inspired these offers of service and the promptitude with which they were made. It is hoped to reply to them all as soon as possible, but some delay is inevitable in view of the very large number of offers received.

Foreign Officer Attached

LT. BRANDT-MOELLER, of the Danish Royal Air Force, has been attached to the Royal Air Force School of Aeronautical Engineering, Henlow, from August 29 until the completion of the course.

No. 150 (B) Squadron—Information Wanted

THE Commanding Officer and officers of No. 150 (B.) Squadron, Boscombe Down, Wilts, state that they would be grateful for any information from old members of the squadron as to the unit's war-time service. Documents or photographs, they add, would be particularly welcome, and, after copying, originals would be returned to their owners.

Benevolent Fund and F.A.A. Officers

THE Council of the Royal Air Force Benevolent Fund have resolved that R.N. and R.M. officers attached and holding temporary R.A.F. Commissions shall be eligible for help from the Fund whilst so serving, and also subsequently if they are in distress for reasons which are definitely attributed to service with the R.A.F.

Whilst holding R.A.F. Commissions, officers are invited to subscribe to the Fund similarly to R.A.F. officers, who have been invited to make a voluntary subscription of one half-day's pay a year.

2nd Class Civil Aircraft Navigators' Licences

IN order to assist R.A.F. officers and airman pilots who are contemplating taking up civil flying posts when they leave the Royal Air Force, a scheme has been established whereby pupils who satisfactorily pass the short navigation course at Manston or the general reconnaissance course at Thorney Island*, will be exempted from taking the greater part of the examination for the 2nd Class Civil Aircraft Navigator's Licence, providing that they obtain in the six subjects of the R.A.F. examination specified below, not less than 60 per cent. of the marks in each subject and not less than 70 per cent. in the aggregate:—(i) D. R. Navigation; (ii) Maps and Charts; (iii) Compasses; (iv) Meteorology; (v) Instruments; (vi) Mathematics. This exemption will be held over until such time as the officer or airman pilot is about to leave the service and take up a civil flying post.

All pupils desiring to take advantage of this scheme will be required to take a supplementary examination in the following subjects, viz.: (i) International and United Kingdom air legislation; (ii) Civil radio organisation and procedure (Oral examination only); (iii) Signalling.

* As a temporary measure the scheme will apply also to the R.A.F. courses held at Air Service Training, Ltd., and the Imperial School of Air Navigation after May 24, 1938.

Air Ministry's New H.Q.

ACCORDING to a recent report, Berkeley-square House, the £1,000,000 building now nearing completion in the West End of London, will be occupied by the Air Ministry towards the end of this month. It will house some 2,000 persons in the Department of the Air Member for Research and Development and in the Contracts and Equipment Directorates.

Axes for Emergency

PROVISION is being made to stow a fireman's axe in the larger types of aircraft. The use of an axe has been found to be the simplest and most effective means for breaking through metal panels and other types of fuselage covering in the event of the crew being unable to use the normal exits in a crash.

Officers commanding units equipped with aircraft provided with axes are to ensure that their use is explained to personnel who may be called upon to use them. In this connection it is important that personnel should be aware of the portions of the cabin, or fuselage, which can be most readily broken through. When this is not self-evident the most suitable areas should be outlined in black or yellow.

Royal Air Force College

T. J. F. DAVY, F. R. Bird and D. C. Sharman (from No. 1 School of Technical Training (Apprentices), Halton) and C. Temlett and J. MacDonald (from the Electrical and Wireless School, Cranwell), have been selected for cadetships at the Royal Air Force College on the result of the examinations held on completion of their three years training as aircraft apprentices.

Viscount Wakefield scholarships, of the value of £75 each, have been awarded to Flt. Cdt. F. R. Bird, formerly an aircraft apprentice at No. 1 School of Technical Training, and to Flt. Cdt. G. H. M. Riddell, an open competition entrant.

The Hyde-Thomson Memorial Prize, of the value of approximately £29, has been awarded to Flt. Cdt. C. Temlett.

Central Flying School

THE undermentioned officers and airman pilots who attended the flying instructors' course at the Central Flying School from May 5 to July 16, 1938, have been categorised as under:—

*A.*2.—Flt. Lt. H. P. Bramwell (Lt., R.N.), F/O.s E. R. Bitmead and G. D. Garvin.

B.—Flt. Lts. E. H. P. Clarke, E. M. Donaldson, A. Ford-Kelsey, J. G. MacIntyre, R. V. L. Pattison, H. C. Sawyer, R. C. Tillard (Lt., R.N.); F/O.s E. R. Berrill, A. H. Donaldson, R. E. Dupont, J. N. Glover, C. F. King, R. J. C. Nedwill, H. M. Pinfold, J. J. Raine, F. L. Sayers, J. F. Spanton, D. C. Torrens, C. A. Wood; P/O.s F. E. W. Birchfield, L. W. G. Gill, T. A. Heath, D. Hill, A. F. McGhie, J. G. Mason; A.P/O. D. Bamford; Flt. Sgts. Biddulph, F. M., Egan, D. M., Johnson, W. A. F., Moxey, R. V., Nelson, R., Poltock, L. H., Wilcox, L. L. K., Willis, J. S.; Sgts. Blackburn, J., Hayter, T. H., Waylen, H. W.

Flying Accident

THE Air Ministry regrets to announce the following accidents:—Sgt. Ronald Ashley Cowan, Sgt. Harry Newby, and A/C.2 Peter Asquith Corp, lost their lives in an accident which occurred at Keddington, near Stradishall, on September 29, to an aircraft of No.148 (B.) Squadron, Stradishall, Newmarket, Suffolk. Sgt. Cowan was the pilot.

P/O. John Goodhart Mason (pilot) and A.P/O. Roderick Gordon James lost their lives in an accident which occurred at Shipton-under-Wychwood, Oxfordshire, on September 30, to an aircraft of No. 6 Flying Training School.

Royal Air Force Gazette

Royal Air Force

General Duties Branch

Group Capt. J. C. Russell, D.S.O., is appointed Air Aide-de-Camp to the King (July 1) in the vacancy created by the promotion of Air Comdre. K. R. Park, M.C., D.F.C., to air rank.

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—R. G. Seys, D.F.C. (August 7); F. S. Stapleton (Acting Flight Lieutenant); E. A. Verdon-Roe (September 16).

Lt. Cdr. J. A. D. Wroughton, R.N., Sqn. Ldr. R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (September 14).

The following Flight Lieutenants cease to be seconded to the Royal Air Force on return to Army duty (September 17):—R. C. M. Ferrers (Capt., The Cameronians); R. E. Weld (Capt., Royal Tank Corps); K. J. McIntyre (Capt., Royal Tank Corps).

Sqn. Ldr. B. A. S. Lewin is placed on the retired list at his own request (September 26); Flt. Lt. P. N. J. Wilkins is transferred to the Reserve, Class A (September 23).

Princess Mary's Royal Air Force Nursing Service

The following are appointed to the permanent service (September 1):—Sister: Miss M. G. Bryant; Staff nurses: Miss E. Maltman, Miss J. H. Coleman, Miss D. Morris.

Royal Air Force Volunteer Reserve

Medical Branch

W. S. McKenzie, M.B., B.Chir., F.R.C.S., L.R.C.P., is granted a commission as Flight Lieutenant (September 27).

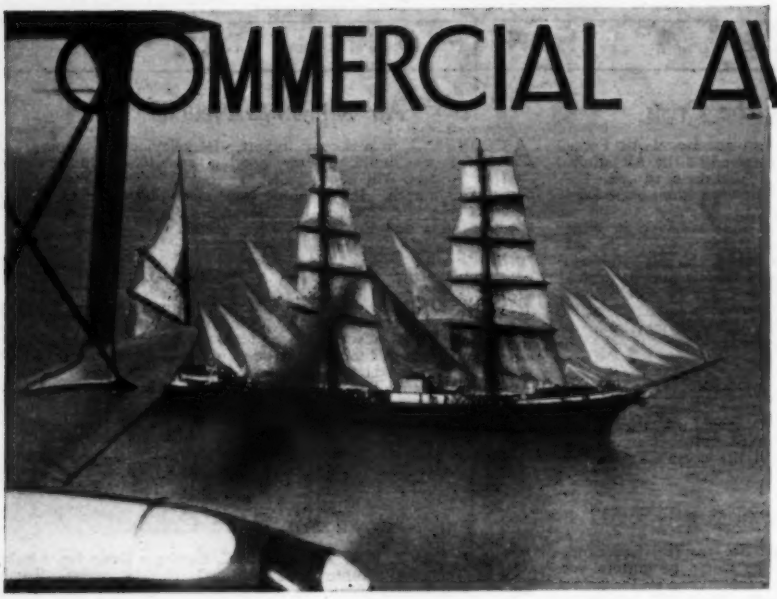
Auxiliary Air Force

General Duties Branch

No. 901 (COUNTY OF LONDON) (BALLOON) SQUADRON.—The Rt. Hon. Sir Kingsley Wood, M.P., is appointed Honorary Air Commodore (September 27).

Owing to the greatly increased length of these lists, as a result of R.A.F. expansion, ranks are confined to those of Flight Lieutenant and above.

COMMERCIAL AVIATION



THE WEEK AT CROYDON

—and What a Week! "A. Viator" Looks Back on the Crisis

ONCE again the commercial aeroplane has proved its value. It is not too much to say that, in the dark days of last week, the peace of Europe and perhaps of the world was saved by the aeroplane.

Speed was the essence of the business, and no other form of transport could have brought the leaders of the nations together in time, nor established that personal contact between them, which, I am convinced, was the most important factor in saving the situation.

All the puffing and panting, churning, chugging, whistling, and syren-blowing; all the antique fuss and paraphernalia of trains and boats was dispensed with, and statesmen nipped to and fro between distant countries as easily as they might travel between, say, Downing Street and Chequers—and without having to wait in traffic blocks at that.

Inveterate grumblers at the "nerve-racking" noise of airliners, before letting loose their next volley of invective, should take a deep breath, count 50, and think of the crisis days.

Incidentally, we owe British Airways, Ltd., a debt of gratitude for the smooth and efficient way in which they carried out the transport arrangements for the Prime Minister. If Heston stole all the thunder, it is because the company concerned insisted, against considerable opposition in the past, on buying the type of transport aeroplane which is needed for fast and efficient service.

A British airliner such as might have carried the Prime Minister to one of his conferences with Herr Hitler with befitting speed and dignity and which might have flown Britain's civil air ensign with a clear conscience was due for delivery at Croydon on Monday, October 3—to have some chairs fitted into it.

Now is a time for looking facts in the face, and if you think you know any other reason why the Government chose British Airways rather than Imperial Airways for the most important flights in history up to date you are welcome to the knowledge.

Croydon had its high-lights, of course. There was intensive trench-digging with mechanical diggers taken off levelling work. Between the main building and the hotel there was considerable grubbery in the shrubbery, resulting in a lovely trench. In war you mustn't grumble and must take what's coming to you cheerfully, even though the main building falls into your trench on the one side and the hotel collapses into it on the other. Some newspapers seem to think we were not prepared for war, but you ought to have seen the Croydon A.R.P. arrangements. I was let into the secret, more or less, at the eleventh hour, and, in spite of being fully trained in A.R.P. and a qualified instructor, I was dumb with astonishment at the amazing *simplicity* of the scheme.

Then there was the pink-cheeked young gunner subaltern who suddenly arrived at—well, at an airport not a million miles from London—very definitely on a war footing, to judge from the size and newness of his field boots. He announced in an unnaturally gruff voice that he had come to "take over this place."

He parked his gun, together with six men and a bombardier, on a remote edge of the airport in torrents of rain, and the aircraft of all nations ascended and descended round his ears. He had the snowiest white tent ever seen, forming a wonderful landmark despite a small branch of a local tree draped over it for camouflage.

Bless his innocent heart, he reminded me of the start of the last war, when, as a downy 2nd lieutenant, I issued my orders to the Lord-Lieutenant of a county and wasn't a bit surprised when he obeyed them. I should die of astonishment if he did so to-day.

Right at the tensest moment of last Thursday I saw a D.L.H. swastika-decorated liner draw up peacefully on the tarmac alongside the Czechoslovakian Douglas.

Commercial air people of all nations, even though mostly, no doubt, ex-Service folk and reservists, are the most peaceful crowd you can imagine, and the whole lot carried on in a friendly way throughout. Nations are just beginning to see what aviation folk, as I have frequently pointed out in these columns, have realised for years.

Back to Normal

Refugee traffic of all sorts on every airline was brisk throughout the crisis; people who thought they might get interned leaving various countries for home and people of one political complexion getting out of countries where a change of rulers was expected. So long as they paid their fares the air companies welcomed them with open arms.

Various gifts, including, I am told, a gold watch and innumerable flowers, arrived by air from different countries for Mr. and Mrs. Neville Chamberlain. Amongst them was a huge specially constructed Groningen cake from certain grateful Hollanders of that city.

Most of the big companies introduced their winter time-tables on October 1, and for once I saw nobody caught wearing a white cap cover after zero hour.

It is jolly to see the mechanical excavators back at work on their normal surface-levelling job, but I trust the authorities will not slip back into a state of coma.

The crisis showed up a good many weak places in Air Ministerial armour—in fact, the armour was about as adequate as that of a lobster which has been run over by a steamroller. It was very definitely not the Air Ministry people at the Airport who were responsible.

Every manager and representative at Croydon owes a debt of gratitude to the Croydon Air Ministry staff and to Air Commodore Robertson, the Airport Superintendent, for the cool and helpful way in which he handled the situation.

A. VIATOR.

Mails for North Eastern

WHILE almost inevitably, in the interests largely of general efficiency, there has been a steady tendency for internal airline operators either to merge or to work in close co-operation, it would probably be a very bad thing if the whole of this internal network was under the control of one concern. Two or three strong firms remain outside the Railway Air Services group, and these companies are doing good and useful work.

By way, perhaps, of showing that the powers-that-be realise the disadvantages of complete totalitarianism, North Eastern Airways have recently been granted a contract for the carriage of mails from Perth, Newcastle, Leeds, Bradford and Doncaster to London, and the first series of mail bags from these different points were brought in to Croydon on last Monday's southward service

Few days could have been less suitable, since there was a westerly to south-westerly wind of 40-60 m.p.h. blowing in the north of England, and even in the south this wind was strong enough to cause delays. Actually the machine arrived at Croydon only five minutes late—and that after rapid ceremonials had taken place at the various loading centres. The wind was, in fact, so strong that a change of machine was made at Newcastle, where the conditions were such that, as a cautionary measure, the mails were transferred from the comparatively lightly loaded Rapide to one of the company's two Envoys. It was not that the Rapide could not be used—Mr. Naish had already brought it quite safely from Perth—but the Envoy was, in any case, available at Newcastle, and this was flown by Mr. Boitel-Gill to Yeadon (Leeds-Bradford), and Doncaster before proceeding to Croydon.

Naturally enough, the real interest in this inaugural flight was shown at the various posting centres, and not at the airport of delivery. At all the cities and towns the machine was given a send-off by quite large crowds which were headed by the local notabilities, while at Croydon the mails were officially accepted by two Post Office representatives.

The new contract permits letters to reach London by the afternoon delivery after being posted before 8 a.m. in Perth, before 9.45 a.m. in Leeds, and before 11 a.m. in Doncaster. If and when the Post Office considers the idea of having a sorting station at Croydon airport itself, these internal mail arrangements will be very much more helpful to correspondents who are writing abroad. As it is the letters must be taken to London and out again to Croydon.

Incidentally, the board of North Eastern Airways, which was originally founded as a company in 1935, has recently been joined by Lord Nigel Douglas-Hamilton. Although primarily concerned with internal air transport, Mr. Jaques, the managing director, has for the last three years been very interested in the idea of running a service to Switzerland in competition with Swissair. We may yet see the development of this idea, which was, when it was first put forward, a very logical one. It should not be long, however, before Imperial Airways have really fast and suitable machines on the Zurich run.

Far East Expansion

DESPITE the totalitarian aspect of Japanese life in general, only now is an attempt being made to co-ordinate the air transport services in Japan, Manchuria and North China. At present there are as many as four companies under Japanese control—Nippon Kokuyusa K.K., Manchu Koku Kaisha, Keitsu Koku K.K., and Kokusai Koku Kaisha—though three of them are united to some extent through similar directorates.

The first three have been formed to operate in Japan, Manchuria and North China respectively, while the fourth, the name of which, freely translated, is the International Airways Company, has been formed to operate services between Japan and other areas under her control. The company's base is at Fukuoka and services will shortly be opened to Hsinking, Peiping, Tsingtau, Nanking and Formosa. The idea for the future is to establish services to those South Sea Islands under Japanese control. For the moment the various companies are largely dependent on foreign machines for their operations, but considerable efforts are being made to design and produce suitable machines in the home factories.

The Lourenço Marques Rally

PROBABLY the largest number of aircraft ever seen together south of the Equator assembled at the new Lourenço Marques aerodrome for the rally which was held on the 3rd and 4th of last month. Altogether, there were 74 machines, of which all but 20 were of different D.H. types.

Although aviation is only just coming into its own in Portuguese East Africa, considerable development has taken place at Lourenço Marques, and improvements and alterations are still in progress. The colony's operating company is known as D.E.T.A., and is part of the Department of Railways, with Major Pinto Teixeira at the head of the organisation; Major Teixeira is also, incidentally, the Mayor of the city. During a little more than a year's operation, their fleet has flown more than 2,000 hours without an accident of any kind—which is a remarkably good record. All but one of the pilots are South African-trained Portuguese Colonials.

Very shortly, the regular service up the coast to Quelimane is to be extended as far north as Mozambique. Recently, D.E.T.A. acquired three Junkers Ju.52s, but the four Rapides which they are also operating are still very popular because of the small size of some of the aerodromes used and the difficult country over which the services run. In addition to these four Rapides, D.E.T.A. also use a Dragonfly and a Hornet.

The operations are managed by Major Pinha Da Cunha, while the chief pilot is Signor M. M. Rocha, who has recently been taking courses of navigation and blind flying in this country; in his absence Mr. Daniel Rabec has been in charge. Practically all the 2,000 hours mentioned has been put in on D.H. machines, and the recently imported Ju.52s have not yet done much more than 50 hours in service.

AN AFRICAN RALLY: More than seventy machines appeared at the Lourenço Marques aerodrome for the air rally early last month. In this aerial photograph most of them are seen parked in front of the D.E.T.A. hangar. On the tarmac are this concern's three recently acquired Ju.52s, while on the right there are the four Rapides, the Dragonfly and the Hornet which are also used by the company.

COMMERCIAL AVIATION (CONTINUED)

Zoning in Jersey

ON and after next Monday a controlled zone will be in force around Jersey Airport, consisting of an air space up to 3,300ft. and covering an area bounded by a circle of 5 miles radius. The usual regulations and notifications will apply.

Derby's Aerodrome

A "PUBLIC USE" licence has now been issued for Derby's municipal aerodrome at Burnaston. Its position actually lies 1¼ miles south-east of Etwall. All the runs exceed 1,000 yds. except that from north to south, which is 860 yds. long; the maximum run is 1,170 yds.

Night Ferry

THIS year, after the change from summer time, Western Airways are maintaining their schedule, which involves a final departure and landing in the dark. Weston airport is equipped with a fixed floodlight and Cardiff has its shadow-bar equipment.

On Sunday, when the first night ferry flight was made on this run, the weather was far from attractive, with low cloud and rainstorms in the area, but everything appeared to go off according to schedule. The event was attended by a certain amount of ceremony; the Lord Mayor of Cardiff met the Rapide on arrival, and the whole affair was broadcast by the B.B.C., though a commentary from the machine failed to get across. Mr. Whitney Straight said this was Britain's first internal night service—a claim that would appear to be justified if Jersey Airways, who finish certain of their runs after dark, are not regarded as "internal."

Daylight in the Argentine

OF the four companies operating in the Argentine—Pan-American Argentina, the Sociedad de Transportes Aereos, the Condor Syndicate and the Aeroposta Argentina—the last-named has undoubtedly been through the hardest times in the course of development. Since the early days this company has concentrated on the Patagonian lines which, in 1935, were extended as far south as Tierra del Fuego.

Although subsidies were available, the company could not use machines with adequate carrying capacity, and in 1936, indeed, it seemed that Aeroposta Argentina would fade out of the picture. During three of the four critical months, however, landing grounds, with workshops and radio stations, were laid out, and after the French financiers had explained that they were unwilling to run any further risks, the directors put their case before the Government and succeeded in showing the importance of the Patagonian route.

Thereafter a modernising scheme was carried out, foreign instructors were obtained to train local pilots and operators, and additional available capital permitted the purchase of three Junkers Ju.52s. The purchase of the latter was a specially courageous move, since their use involved the complete reorganisation of radio equipment along the route.

Since then the Buenos Aires-Tierra del Fuego service, which covers a distance of 1,600 miles, has been operated with regularity and two new lines are now contemplated. One is a feeder from San Antonio Oeste to Bariloche in the Andinos district to link the capital up with a holiday resort, and the other is an international connection with Chile, the suggested terminus being Magallanes.

Difficulties, of course, still remain, but the reconstructed Aeroposta Argentina now appears to be looking forward to an important future.

All About Aerodromes

NOT a great deal has been published about aerodrome requirements for modern conditions, and a number of people ask from time to time where they can obtain information about such matters as site selection, drainage, approach clearance, lighting, and even minimum dimensions. Recently the Indian Directorate of Civil Aviation published a book under the somewhat voluminous title of "Notes on the Preparation, Licensing and Operation of Civil Aerodromes and Landing Grounds," which is published by the Manager of Publications, Delhi.

Chapters are devoted to all the points on which information is often lacking and more important matters, such as signals to be displayed, aerodrome markings, minimum runways and zoning requirements, are illustrated by sketches.

India, of course, is rather a special position since aerodrome construction there is attended by several difficulties, probably the greatest of which is that of drainage to cope with monsoon conditions. Additionally the altitude and high temperatures in many parts of the country make aerodrome size of paramount importance, and in this book there are graphs giving a comparison of the runs required at different heights and temperatures.

Up to the present the Indian Government has been obliged to devote its available resources to developments on the main trans-Indian route and on two feeder routes, and otherwise air transport has had to rely largely on the existing Service ground organisation. At the same time provincial Governments and private individuals hesitate to prepare aerodromes while there is an obvious lack of machines to use them, and a vicious circle is the result. Some Indian States are, however, laying out aerodromes in their territories, and others may be expected to follow suit.

This document is of considerable value, and should be of real use to prospective constructors of aerodromes.

Winter at Portsmouth

BY the regrettably simple process of dropping a 'nought,' we gave in last week's issue an unhappily low figure for the number of passengers which have been carried on the various services of Portsmouth, Southsea and Isle of Wight Aviation. This figure should, of course, have been 40,000. Actually the final figures are not yet available, but it may still be safely stated that more than 35,000 passengers have been carried during the summer season.

In addition to the winter service between Southampton and Ryde, the company is also running services from the Isle of Wight to Portsmouth and Bournemouth.

Consolidated Boat for Atlantic

AMERICAN EXPORT AIRLINES INC. announce the purchase, at a price of $200,000, of a Consolidated long-range flying boat for the purpose of making survey flights across the Atlantic preparatory to instituting a regular scheduled service. The machine will operate from New York and it is planned to chart routes to the principal European countries, to North Africa, and to Asia Minor. The routes to be flown will complement the service of America Export Lines, which for twenty years have operated steamships to the Mediterranean and Black Sea countries. Permits have been granted by the countries concerned.

The machine chosen for the experimental flights weighs 15 tons and is a twin-engined semi-cantilever monoplane with a top speed of over 200 m.p.h. at 8,000 ft. It will be manned by a crew of six, and at cruising speed will have a range of about 4,000 miles with a payload of 2,000 lb., in addition to the crew. Specifications and prices for larger, faster and more luxurious aircraft for non-stop transatlantic operation with passengers, mail and cargo are now in the hands of the operating company.

Current plans call for close co-ordination of the steamship services with the flying boats. The steamers will serve as floating meteorological posts and mobile bases. Officers on these ships have been undergoing special training for this work for about a year.

New French Transports

NOW that Air France has equipped its European, West African, and Far Eastern routes with Marcel Bloch 220s, Potez 62s, and Dewoitine 338s, all of which are high-performance machines and are satisfactory from the commercial standpoint, the company has no intention of remaining dormant in the matter of testing out still newer types. The technical staff have their eyes on a number of machines which are in various stages of completion.

Among the interesting new prototypes of high passenger capacity are the Dewoitine 342 (three Gnome Rhône 14 N) for 24 passengers, and the big four-engined Wibault, which is designed to carry a crew of 8 and 70 passengers for 300 miles, 50 passengers for 600 miles, and 26 passengers in sleeping berths for 3,000 miles. Both of these are under construction.

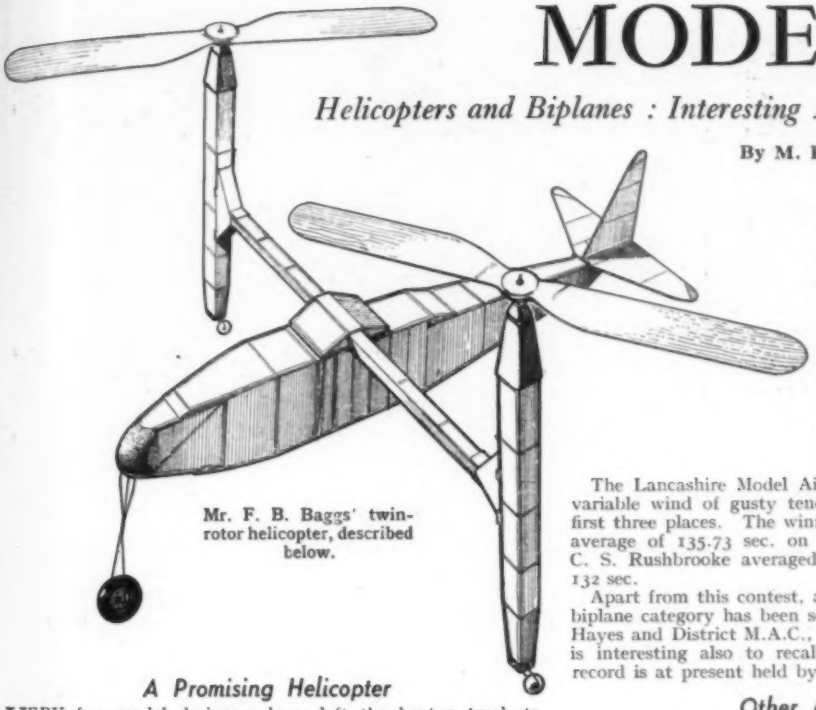
There are also the thirteen-ton Marcel Bloch 160s (four Hispano 12X engines of 690-720 h.p.), two of which have been built since the prototype took part in the Istres-Damascus-Paris race, and the Marcel Bloch 300 *Pacifique* (three Gnome Rhône K 14s), both of which have yet to carry out the Air France tests.

In addition to these machines, Air France is showing interest in the 200 m.p.h. seven-passenger Potez 661 (four Renault 220 h.p. engines), and the high-performance Potez 662, which will have four 660 h.p. Gnome Rhône M 14 engines. The latter only flew for the first time in July.

MODELS

Helicopters and Biplanes : Interesting Models in Competitions

By M. R. KNIGHT



Mr. F. B. Baggs' twin-rotor helicopter, described below.

A Promising Helicopter

VERY few model designers have left the beaten track to tackle so difficult a type as the rotorplane, of which probably not more than half a dozen examples have been produced having a really consistent performance. The helicopter is a still rarer species, and not until July last, on Wimbledon Common, had the writer encountered a successful model of this type. Very great credit is due to Mr. F. B. Baggs, of The Model Aircraft Club, whose twin-rotor helicopter, illustrated on this page, has made numerous vertical and horizontal flights, in some instances rising from the ground.

The fuselage serves to carry the rotor assembly, the tail unit and a nose-wheel, but not the rubber motors. These are concealed in the vertical members which support the rotors, each consisting of five strands of $\frac{1}{4}$in. flat rubber. These vertical members measure 13in. by $\frac{7}{8}$in. by $\frac{7}{8}$in., and have a $\frac{1}{4}$in. wheel as the base. They consist of four distance pieces of $\frac{3}{32}$in. by $\frac{3}{32}$in. balsa, with cross-struts of the same material, and when attached to the cross-member they have an inward tilt of 5 deg., thus imparting to the rotors a dihedral angle for the sake of lateral stability. The cross-member has sides of $\frac{1}{16}$in. balsa sheet, and is flexibly coupled to the fuselage. It is given a forward tilt of 7 deg. to secure the forward thrust essential to horizontal flight. Vertical flight is obtained by eliminating this forward inclination.

The oppositely rotating rotors have a diameter of 16$\frac{1}{2}$in., a mean width of 1.6in., and a blade incidence of 4 deg. They are carved from solid balsa, have the undersides of the blades hollowed, and are tissue covered. Rotation is clockwise and anti-clockwise. A free-wheeling device comes into operation when the power ceases. The hubs are 18in. apart, and 6$\frac{1}{2}$in. above the top of the fuselage.

As it was desired to impart adequate strength to the motor-carriers without adding unduly to the weight of the model, the fuselage members are rather slender. The four longerons and sundry cross-struts are of $\frac{1}{16}$in. by $\frac{1}{16}$in. balsa, covered with doped Japanese tissue. The length is 18$\frac{1}{4}$in., the depth 3in., and the width 2$\frac{5}{8}$in. A removable rubber-tyred wheel, 1$\frac{1}{2}$in. in diameter is carried by 18 s.w.g. struts beneath the nose.

A flat, double-surfaced tailplane, triangular in plan form and measuring 8$\frac{3}{4}$in. by 3in., is mounted at 0 deg. incidence. The fin height is 5in. Balsa strip, $\frac{1}{4}$in. by $\frac{1}{16}$in. is used for tailplane and fin, which are permanently coupled.

All components are covered with doped tissue. Rotors, motor carriers, cross-member, tail unit and front wheel are all detachable. The total weight of the model is 3 oz. At the time of writing, the best performance has been 25 sec., hand-launched.

Biplanes in Bulk

NEGLECTED for many years, the model biplane is belatedly winning widespread popularity just when its full-scale counterpart is retreating before the all-pervading monoplane. The type has been regarded as inferior in performance to the monoplane model, but surprisingly good results by various experimenters resulted in a field of no fewer than 70 entries in this year's biplane contest held by the Society of Model Aeronautical Engineers. Models were required to have a wing area of at least 200 sq. in., that of the smaller wing to be not less than 50 per cent. of the greater.

The Lancashire Model Aircraft Society, despite a cold and variable wind of gusty tendency, succeeded in capturing the first three places. The winner was Mr. H. Holbrook, with an average of 135.73 sec. on three rise-off-ground flights. Mr. C. S. Rushbrooke averaged 133.16 sec., and Mr. A. Tindall 132 sec.

Apart from this contest, a new rise-off ground record in the biplane category has been set up by Mr. A. C. Minion, of the Hayes and District M.A.C., with a flight of 4 min. 57 sec. It is interesting also to recall that the seaplane rise-off-water record is at present held by a biplane, with 6 min. 54 sec.

Other Models News

APART from the contests at The Model Aircraft Club rally held at Wimbledon on September 11, there were some interesting demonstrations. Mr. C. A. Rippon, of the Northern Heights Club, flew "Cyrano," a cabin monoplane with flexible drive connecting the rubber motor in the fuselage with a pusher airscrew behind the backswept, tapered wing. Mr. C. Rupert Moore's mid-wing day-bomber, with realistic gunturrets, and "hush-hush" drive transmitting power from the rubber in the fuselage to an airscrew in a nacelle beneath each wing, was the centre of an interesting crowd. There were also successful mid-air separations by a low-wing composite.

Miss Pauline Gower presented the competition prizes.

* * *

Portslade Downs was the scene of a gala day sponsored by the Brighton, Portsmouth, West Sussex and Worthing Model Aircraft Clubs. Amongst the contests was one for petrol-engined models, in which the South Coast Trophy was won by "Haze," an 8ft.-span tapered high-wing cabin monoplane, designed by Mr. H. Norman, of the Hayes and District M.A.C. This machine has made over 145 flights to date. The engine is a 1938-type 9 c.c. Gold Seal Ohlsson.

* * *

Mr. Norman's model, "Haze," also won the Hayes Club's Frost Trophy for petrol-engined models. Points were awarded for take-off, stability, landing, construction, and engine efficiency. Mr. Lobell, chief designer to the Fairey Aviation Co., acted as referee

Two Outstanding Issues

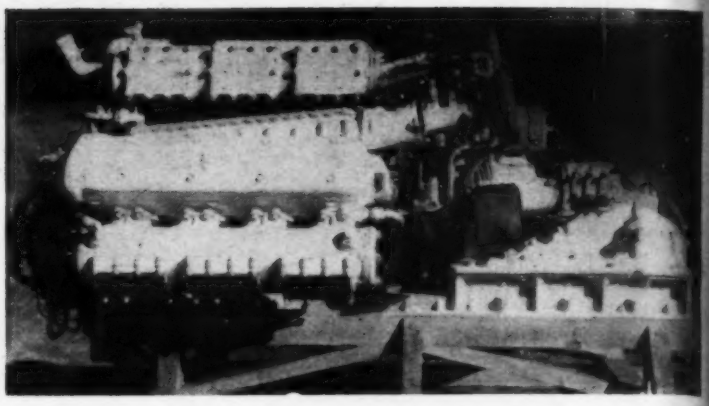
of

FLIGHT

TWO outstanding Special Numbers of "Flight" will shortly make their appearance. They are the annual **BRITISH AIRCRAFT INDUSTRY NUMBERS.** Together, these issues form a work of reference which no one in the industry can afford to miss. Everyone, indeed, who prides himself on being up to date in his knowledge of current practice in British aircraft and equipment should make certain of studying these two notable numbers. Here are the dates :—

October 27 *COMPLETE AIRCRAFT*

November 3 *ENGINES, EQUIPMENT and MATERIALS*



FOR SPEED ON WATER: A Power-Napier Sea Lion engine, as fitted to M.T.B.s and high-speed craft for the Air Ministry, is being exhibited by the British Power Boat Co. Ltd., in the Marine Section at the Motor Exhibition, Earls Court (October 13-22). The unit is a development of the famous Napier Lion twelve-cylinder "broad arrow" aero engine.

THE INDUSTRY

In Another Element

ESSO Ethyl fuel and Wakefield Castrol oil were used in Sir Malcolm Campbell's Rolls-Royce-engined boat *Bluebird* when he raised the water speed record to 130.9 m.p.h.

Graphite-impregnated Bearing Metal

DETAILS of the characteristics and applications of "Brigramet" graphited bearing metal are given in a booklet issued by the British Graphitised Metals Co., Ltd., Shell Mex House, London, W.C.2. The metal is a lead-base alloy with the addition of tin, copper, nickel and antimony as hardeners, and it is impregnated with Acheson's colloidal graphite. A noteworthy testimony to this metal is its standardisaion for the front and centre main bearings of the engines of E.R.A. racing cars.

About Three Famous Engines

THREE unusually interesting and informative catalogues—it would be almost correct to refer to them as handbooks—have recently been issued by three leading manufacturers of aero engines.

Of particular interest are the different ways in which the same underlying idea is presented. First, if only on the score of its exquisite presentation, is the Rolls-Royce publication dealing with Merlin engines, both photographically and graphically. Rather different in style is a De Havilland booklet on the Gipsy Twelve engine. This publication deals very thoroughly with not only the engine and its performance, but also with its equipment and installation.

Lastly, there is the original booklet published by Pratt and Whitney Aircraft, dealing with the Series "C" Twin Wasp engine. Cut out to the shape of the engine, the booklet provides, page by page, a series of sectional views of the unit in their correct sequence, apart from informative data, including power curves.

Parnall Developments

AT the third ordinary general meeting of Parnall Aircraft, Ltd., held in London on September 28, the chairman, Sir Louis Vaughan, K.C.B., K.B.E., D.S.O., said that they showed a profit for the year of £89,287, compared with £26,782 last year—an increase of £62,505. Points from his speech were:—

As regards turrets, we have orders from the Air Ministry which will keep us busy for the next two or three years at least, in spite of an increasing scale of production. We are also continuing to build air frames, components, etc., for certain aircraft manufacturers, and our existing contracts alone will keep this section of our organisation busy for some considerable time.

As our report indicates, we have contracts in hand sufficient to keep us fully employed for several years to come. We have, however, under constant consideration the programme to be followed when the present national emergency is over.

As you are already aware, we have a subsidiary company, Nash and Thompson, Ltd., which is engaged solely on design and experimental work, under the direction of Capt. Frazer-Nash. This company has continued to be extremely active throughout the year. Its work is very highly specialised, and the years of research and development have been more than justified.

Last March we gave a very successful demonstration of turrets at our factory at Tolworth. We were honoured with the presence of the then Air Minister, Lord Swinton; of Lord Winterton, and of the Under-Secretary of State, Lt.-Col. A. J. Muirhead, and members of the Air Council. The demonstration was also attended by a large number of senior officers of the R.A.F. I may say that it is our intention to hold a similar demonstration, incorporating our latest developments, at an early date.

As a result of this demonstration we have established at Yate a special training school, at which the personnel of the R.A.F. are now receiving instruction and training in the use and maintenance of our turret installations.

Last year I made a passing reference to the use of the Frazer-Nash inventions for purposes other than aircraft. This matter has received our close attention during the past year, I desire, however, to make the legal position quite clear to shareholders. Under the original agreement for the acquisition of the rights there is a clause entitling the vendors, Capt. Frazer-Nash and Capt. Thompson, to a sole licence for the exploitation of these inventions other than for aeronautical use. A similar clause operates in the service agreements between the company and Capt. Frazer-Nash and Capt. Thompson. Now, to the extent to which these inventions are protected by the patents, which have been assigned to the Secretary of State for Air on the grounds of secrecy, the whole of the rights in them, for whatever purpose, belong to His Majesty's Government absolutely. On the other hand, to the extent to which the inventions or designs are protected by open patents, or in the case of specific patent applications and designs for non-aeronautical purposes, the rights, by way of licence or otherwise for such purposes, are the sole property of Capt. Frazer-Nash and Capt. Thompson.

These gentlemen have, with the knowledge of the board, promoted a company called Powered Mountings, Ltd., to exploit the inventions for military purposes. In furtherance of the policy which I indicated at our last meeting, and have now repeated, I am glad to inform you that we have entered into an agreement with Capt. Frazer-Nash and Capt. Thompson whereby, first, they grant to Parnall Aircraft, Ltd., an option up to April, 1939, to acquire a controlling interest in Powered Mountings, Ltd.; secondly, Capt. Frazer-Nash and Capt. Thompson have undertaken to give Parnall Aircraft, Ltd., a first refusal to purchase control in the exploitation of these inventions for any other purpose. Capt. Frazer-Nash and Capt. Thompson and Mr. H. W. Healy have been appointed executive directors of Powered Mountings, Ltd.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(Published September 29, 1938.)

29979. LORENZ AKT.-GES., C.: Electric wave-filter (491,354).
32530. SIEMENS APPARATE UND MASCHINEN GES: Gyroscopic apparatus (491,479).
34584. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES: Cabins for aircraft (491,358).
4959. JUNKERS & Co., GES.: Safety Ignition devices for gas-heated apparatus (491,368).
5012. MERCIER, P. E.: Landing-gear for aircraft (491,298).
8525. MARCONI'S WIRELESS TELEGRAPH CO., LTD.: Radio transmitting antennæ (491,485).
8912. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Bracing members for the wings, steering surfaces and the like, of aircraft (491,302).

(Published October 6, 1938.)

3616. NICOLLE, A. V., and AUTOMOTIVE ENGINEERING CO., LTD.: Pistons (491,865).
4761. FODOR, J: Lighting systems for suspended metal obstructions in air-defence arrangements (491,713).
6802. CHESTER, C. W.: Towed bombs (491,726).
6873. ALKAN, R.: Automatic stabilising device for aircraft (491,920).
7104. SAMPIETRO, A. C.: Control means of land vehicles, aircraft, and water-craft (491,664).
7197. AUTOMOTIVE PRODUCTS CO., LTD., and CLENCH, E. C. S.: Liquid-pressure remote-control systems (491,730).
7207. ARENS CONTROLS, LTD., and ROOSE, T. R.: Mechanical remote control devices (491,875).